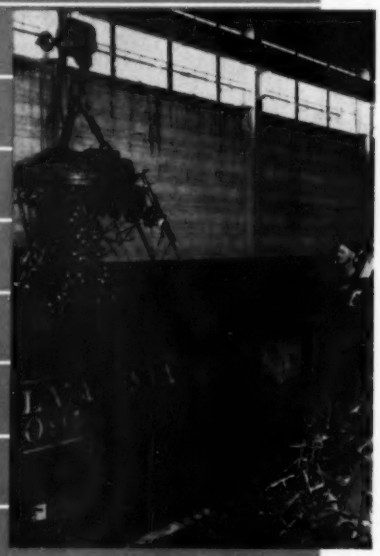
SEPTEMBER 1951

Plant Engineering



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Volume 5, No. 9 Circulation of this issue 32,315

The magazine that helps plant engineers with their everyday problems

A "POINTER" FOR STEPPING UP *YOUR* PRODUCTION

Copper mining is but one example of industry's preference for Texaco. In whatever field they are used, Texaco Products and Lubrication Engineering Service are big factors in stepping up production, bringing down costs.

A case in point: Texaco helped one large metal working plant* increase output 3,528 pieces per month, save $245 a month on down-time, reduce scrap and prolong tool life—all *on just one machine!*

Gain similar benefits in your plant—wherever located, whatever you make. Texaco Products and Lubrication Engineering Service are available in all 48 States. Call the nearest Texaco Distributing Plant or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

*Name on request

TEXACO

TEXACO

LUBRICANTS, FUELS AND LUBRICATION ENGINEERING SERVICE

make these savings!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched ... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all ..."

"Ordinary belts lasted only 5 or 6 weeks ... B. F. Goodrich grommet belts are in their sixth month of service ..."

"Previous belts suffered from shock loads, wore out fast ... BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

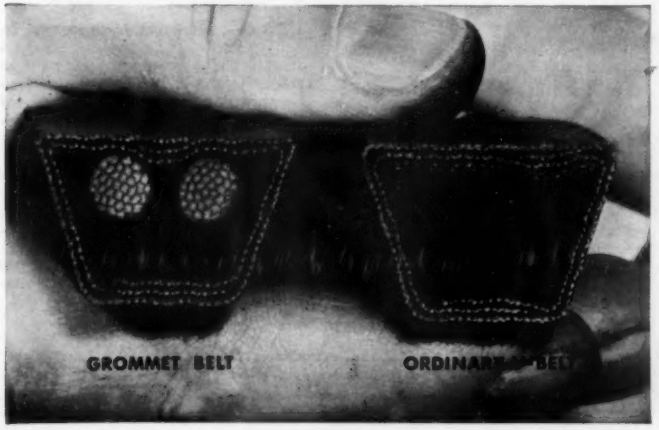
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. PE-9
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name_____

Firm Name_____

_____

Street Address_____

City_____

State_____

K-P CONVEYOR BELTS

Korb-Pettit Spiral Woven Wire Conveyor Belts are manufactured in suitable metals and mesh sizes for conveying, material handling, processing and heat treating. Particularly well adapted for foods and other products that require free circulation of air and drainage. K-P Flextrough Belts have flanged edges for retaining small parts. Side chains are provided for sprocket drive.

COMPLETE SPECIAL PURPOSE CONVEYOR SYSTEMS DESIGNED AND MANUFACTURED

•

Infra-Red Conveyor Dryers

•

Leather Finishing and Drying Machines

•

Wire Cloth and Wire Screens

KORB-PETTIT WIRE FABRICS AND IRON WORKS
INCORPORATED
Engineers and Manufacturers
1501 No. Mascher St.
Philadelphia 22, Pa.

NEW! Ask for 40-page K-P Conveyor Belt Catalog No. 31

'ROUND ABOUT with the editors in field and office

Lighting Contest, Entry Blanks And Rule Books Available

IN MAY 1952 the Fourth International Lighting Exposition and Conference will be held in Cleveland, around the theme "Mobilize Lighting Knowledge to Advance America's Welfare."

An important part of the conference will be the awards for the 1952 Merit Award Competition. The contest deadline is January 31st, 1952. Entries may deal only with installations made between the 1st of July 1950 and the 31st of December 1951.

The contest is divided into five separate classifications: 1, electrical contractors; 2, utility lighting and power representatives; 3, electrical distributors, lighting specialists and salesmen; 4, architects and consulting engineers; and 5, owners and users of industrial and commercial lighting.

Official entry blanks and rule books are now available. They may be obtained from the Merit Award Committee, 4th International Lighting Exposition and Conference, 326 West Madison Street, Chicago 6, Illinois.

New Steels Conserve Nickel and Molybdenum

APPARENTLY nickel and molybdenum are what the economists call "in short supply" due to the defense mobilization work, and world conditions. New steels have been developed to conserve these materials.

The composition and physical requirements of these new steels are listed in new specification sheets issued June 13, 1951, by the American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y. These sheets cover Hot Rolled Alloy Steels, Alloy Steel Wire and Cold finished Alloy Steel Bars.

Plant Maintenance Show — 1952

THE NEXT EXPOSITION of the Plant Maintenance Show will be held at Convention Hall, Philadelphia, January 14-17, 1952. For the first two years the exposition was held in Cleveland, but is being moved to Philadelphia to permit greater attendance from the eastern industrial area.

A Plant Maintenance Conference is also held in conjunction with the show. The conference will include papers and talks by plant executives covering various phases of maintenance problems or solutions they have uncovered in their respective fields.

Advance registration cards and hotel information may be obtained from Clapp and Poliak, Inc., 341 Madison Ave., New York City.

Go West, Young Man! Go West!

VARIOUS DEPARTMENTS of Uncle Sam's organization have made estimates and projections of the future population. These were analyzed by the editor of the Northern Trust Company's "Business Comment" for July. The Census Bureau made a low and high projection of the population in 1960 which runs from 161 to 180 million respectively. If the high estimate of the total population in 1960 proves valid, all regions will have a gain in population of at least 10 per cent.

The New England and Middle Atlantic States will have less than an average gain, about 14 per cent, while the South Atlantic States will grow by 21 per cent. The East, North Central as well as the South Central regions will grow at the same rate as the country as a whole, that is about 19 per cent. The Pacific Coast will gain by almost 35 per cent.

If on the other hand, the population grows more slowly and the low estimate for 1960 proves more accurate, the New England and Middle Atlantic States will grow by only about 2 per cent. The East, North Central and the South Central sections will grow by about 7 per cent, about the national average, but the Pacific Coast will still lead by 21 per cent.

Building Standards Adopted

FEDERAL AGENCIES have agreed to adopt uniform standards of construction in an effort to conserve critical materials. The standards to be observed are the present national standards for structural steel, reinforced concrete, stress-grade lumber and plumbing installations.

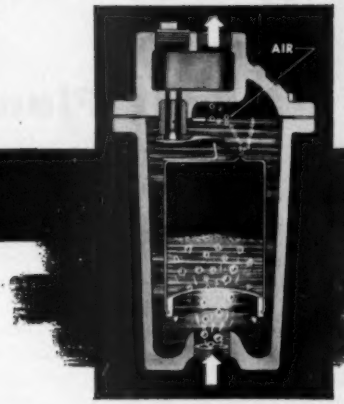
The plumbing code was recently adopted in the interestes of uniformity in material conservation. Approximately 1600 separate plumbing codes now exist in the U.S. Many of these require 40 to 50 per cent more materials than are required by the new code.

(Continued on page 150)

Plant Engineering is published monthly at Chicago, Ill. Subscriptions one year $10 in the U. S. A. Canada $11; Elsewhere $12. Acceptance under Section 34.64, P. L. & R. authorized by Post Office.

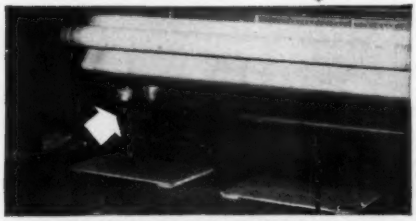
Armstrong traps vent air to give you hotter machines

HIGHER TEMPERATURES MEAN MORE OUTPUT



PSIG	Temp. of Steam with No Air Present	Temperature of Steam Mixed with Various Amounts of Air. (Per Cent Air by Volume)		
		10%	20%	30%
10.3	240.1	234.3	228.0	220.9
25.3	267.3	261.0	254.1	246.4
50.3	298.0	291.0	283.5	275.1
75.3	320.3	312.9	304.8	295.9
100.3	338.1	330.3	321.8	312.4

THIS TABLE TELLS THE STORY. You can't get the maximum temperature you need unless you get the air out.



PYROMETER TESTS SHOWS 30° TEMPERATURE INCREASE on flatwork ironer rolls at *Peter Bent Brigham Hospital, Boston,* after installation of Armstrong traps which vent air along with condensate.

EVERY time an Armstrong steam trap opens there is a momentary pressure drop which "pumps" air down to the trap from the unit being drained. The air passes through the bucket vent and accumulates at the top of the trap to be discharged along with condensate each time the valve opens.

This one basic benefit of the Armstrong trap is saving industry thousands upon thousands of dollars through faster heat-up and higher, more uniform temperatures with resultant greater output and time and labor savings.

You can have this benefit. The cost of Armstrong traps is small in relation to the efficiencies they effect. Call your nearby Armstrong Representative today.

ARMSTRONG MACHINE WORKS
912 Maple Street • Three Rivers, Michigan

SEE OUR CATALOG IN SWEET'S or CEC

HOW TO SELECT the right trap for each application, installation pointers, prices, capacities, other facts and figures are contained in the 36-page **STEAM TRAP BOOK.** Send for your copy.

ARMSTRONG STEAM TRAPS

take this view

Of Your Plant's Electrical System

Distributing electrical power to operate your plant is more than just wiring between transformers and equipment.

The electrical distribution system's flexibility, service continuity, regulation, and efficiency can have a decided effect on your operating economy. There is no all-purpose system to balance these factors . . . to best meet all your needs. That's why it's imperative that your plant have a modern distribution system specifically planned to meet *your* individual requirements.

Power centers provide the simplest way—the low-cost way—of attaining the system you require. Westinghouse Indoor Dry-Type Power Centers also give you these advantages:

THEY COST LESS TO MAINTAIN—no liquids to test, recondition or replace . . . no gaskets, valves or gauges. All parts are readily accessible.

THEY'RE MORE ECONOMICAL—because they eliminate the need for costly vaults and can be located near center of load . . . resulting in shorter secondary circuits, lower line losses. better regulation.

THEY'RE SAFER—from the hazards of fire and explosion; they have no exposed live parts. Breakers and switches have positive interlocking mechanisms, each in its separate compartment.

Your Westinghouse Representative will be glad to discuss your system problems with you. He is prepared to offer complete system information, with advantages of each carefully weighed. Ask him for Booklet B-4045, *"Industrial Plant Distribution Systems"*, B-4162, *"Power Centers by Westinghouse"*. Or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60731

PRIMARY SELECTIVE RADIAL SYSTEM

Low operating and maintenance costs, with moderate initial expense, make this system excellent for installations where the requirements for flexibility, and service continuity are average. To evaluate this system in terms of your requirements, consult your Westinghouse Representative.

Westinghouse

POWER CENTERS

YOU CAN BE **SURE**.. IF IT'S
Westinghouse

Take a whale of a bite out of power costs!

V-Belts by

put cost-cutting teeth in your V-Belt drives with DAYTON COG-BELTS

40% MORE H.P. PER BELT — **FEWER BELTS**

FEWER PULLEY GROOVES — **LONGER BELT LIFE**

There's a whale of a saving in power transmission costs when you use the premium Dayton Cog-Belt! It delivers 40% more h.p. than an ordinary V-Belt. Here's why—

Cog-Belts are built to bend—like your finger—to take up compression strains as the belt goes round the pulleys. Results: Less strain, less heat, less stretch, less maintenance, longer life, less down-time.

Save on the cost of original belting! You need fewer belts, fewer pulley grooves to do the job, when 5 Dayton Cog-Belts do the work of 7 ordinary V-Belts,—and do it better!

Save drive-space, plant space! Cogs permit much shorter center-to-center distances—up to 25% shorter. They save up to 47.2% in drive area.

To end your V-Belt troubles for the long "duration" ahead, give your Dayton Distributor the "high-sign" of better V-Belt power transmission: the arched finger that means Dayton Cog-Belts and important savings!

*T.M.

DAYTON RUBBER COMPANY • DAYTON 1, OHIO

TAKE A TIP FROM A TIPPLE

14 years ago a set of Dayton Cog-Belts went to work, running the tipple at a coal mine at Logan, W. Va. These same veteran Cogs are still on the job! The mine superintendent predicts that they are good for years to come. If you have a drive that's a real toughie, turn it over to a team of Dayton Cog-Belts, for a long, trouble-free life!

Dayton Rubber

WORLD'S LARGEST MANUFACTURER OF V-BELTS

These Strong Steel Windows Have Never Rusted!

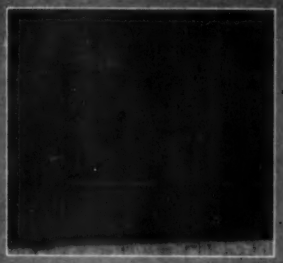
(Un-retouched photographs taken in 1950)

IN TEXAS
INSTALLED IN 1927

Galvanized, unpainted Fenestra Steel Windows in Mallory Pier of Galveston Wharf Company, Galveston—unblemished after a 24-year-long siege of salt spray.

IN MASSACHUSETTS
INSTALLED IN 1928

No rust even after sitting in the steam of the cooking room of the Wm. Underwood Company, Watertown, for 23 years—proof of the protection of hot-dip galvanizing.



IN ILLINOIS
INSTALLED IN 1923

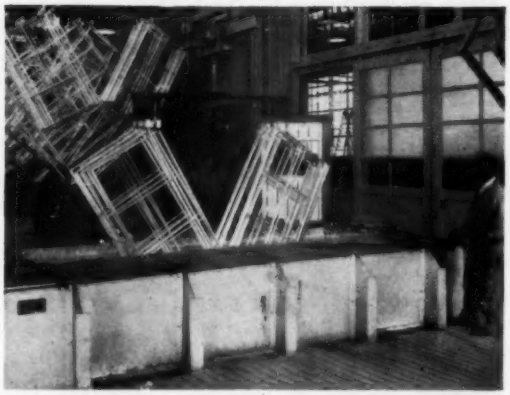
Steel-strong and rust-free, these 28-year-old galvanized Fenestra Steel Windows are still serving faithfully in the steel carshop of the Elgin, Joliet and Eastern Railroad, Joliet.

And Now Fenestra Makes Them *Even More Durable!*

Now Fenestra* engineers have developed a new hot-dip galvanizing system that does an *even better* job—and they've built a brand-new plant around it, the *only* plant of its kind in America. Everything is ingeniously designed to give you *steel-strong* windows that really *eliminate* painting and save you maintenance money year in and year out.

First, the assembled frames are hung from the conveyor separate from the assembled ventilators. Then automatic controls move these assemblies from tank to tank—dipping them, lifting them, controlling each temperature, timing every move.

From degreasing to pickling to hot and cold rinsing to fluxing and drying they go. Then when finally they are perfect for galvanizing, they dip deep into molten zinc. Then they are Bonderized, which prepares the finish to take decorative painting if it's ever desired. Then they are rinsed again. And with every segment of surface, corner, joint and edge covered by locked-on galvanizing, the frames and their vents go to final assembly . . . and to you.



RISING UP out of molten zinc in the great Fenestra galvanizing kettle, these windows will *never* need painting!

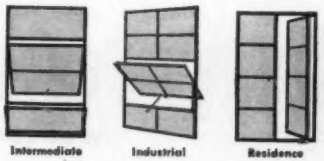
So see them today. Call the Fenestra Representative (he's listed under "Fenestra Building Products Company" in your Yellow Phone Book) or write Detroit Steel Products Co., Dept. PE-8, 2270 East Grand Blvd., Detroit 11, Michigan. *®

Send for Your Free Illustrated Book on Fenestra Hot-Dip Galvanizing

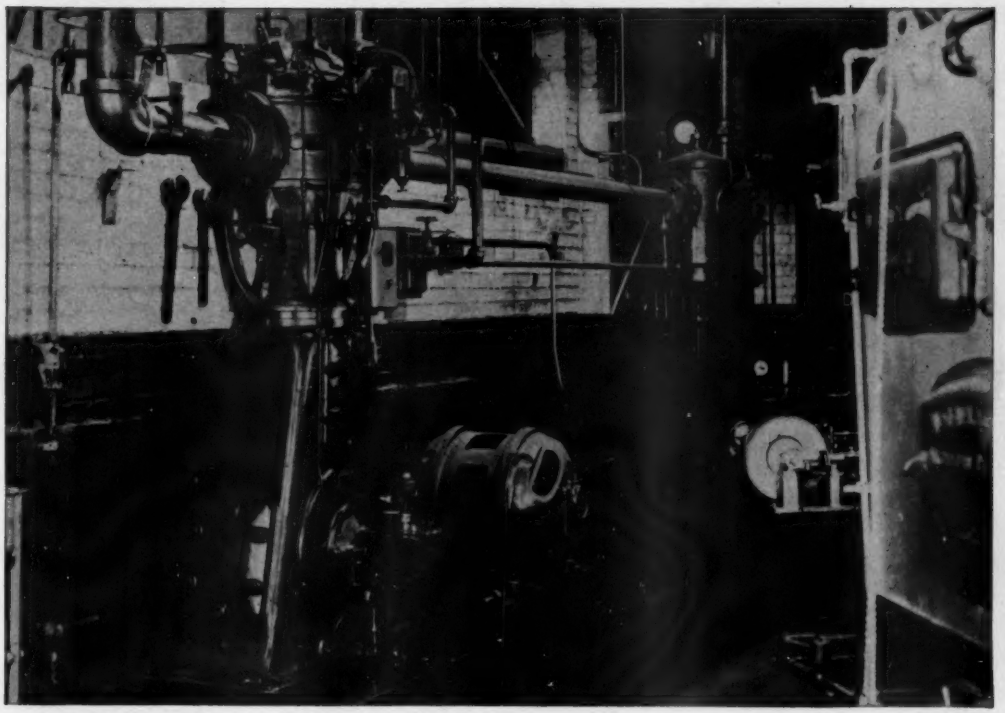
Steel-Strong Windows made to STAY new

Fenestra

HOT-DIP GALVANIZED STEEL WINDOWS



Intermediate Industrial Residence

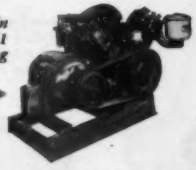


SAVE VALUABLE SPACE WITH THE EFFICIENT

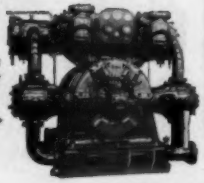
JOY WG-9 HEAVY DUTY AIR COMPRESSOR

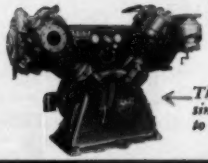
The JOY WG-9 Vertical, with its small base, saves valuable floor space. Built in a range of sizes to 881 CFM, for continuous heavy-duty service. The complete line of JOY stationary units—high and low pressure compressors, oil-free compressors, boosters and vacuum pumps—includes a type for every need, each incorporating exclusive features developed by JOY research. Supplementary products include the only complete line of vaneaxial fans and blowers, and the new JOY Oxygen Generator. ● *Write for free Bulletins.*

The JOY WL-80, in eleven sizes up to 641 CFM, with operating pressures to 125 psi.



The JOY WN-114, in single or twin units up to 7312 CFM.





The JOY WN-112, in single or twin units up to 3656 CFM.

Consult a Joy Engineer

WGD 19766

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

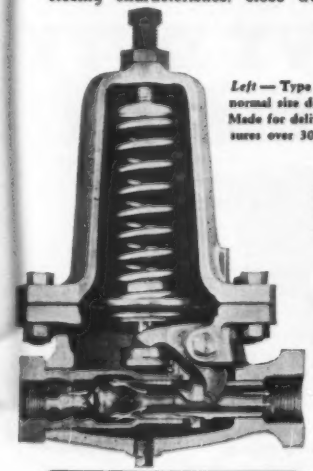
IN PLANNING Your CONTINUOUS PROCESSES INCLUDE STRAIGHT LINE FLOW Valve Advantages

CASH STANDARD Streamlined TYPE 1000 PRESSURE REDUCING VALVES

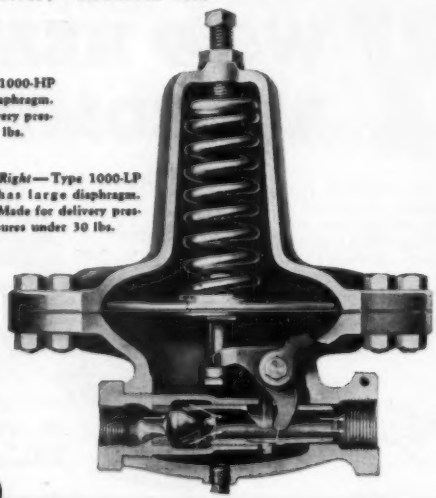
Streamlined flow of steam, air, oil, etc., around the inner valve is an immediate solution to the important need of dependable control under varying loads.

Continuous processes can be dependably protected against slow downs, failures, and maintenance ordinarily due to valve inefficiencies. The STREAMLINED "1000" Valve with ample capacity, tight closing characteristics, close delivery pressure control, and with a wide range of adjustment makes possible speedier production, smooth operation and no spoilage.

You get straight line flow which eliminates turbulence so that at all times you are easily able to meet peak demand and yet hold the reduced pressure constant at the same time. For the complete facts write for Bulletin "1000."



Left — Type 1000-HP normal size diaphragm. Made for delivery pressures over 30 lbs.

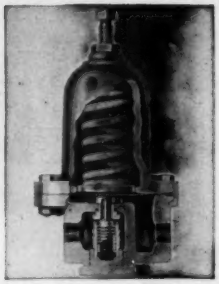


Right — Type 1000-LP has large diaphragm. Made for delivery pressures under 30 lbs.

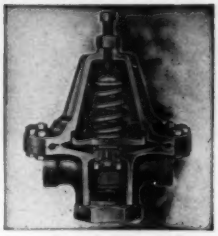
CASH STANDARD CONTROLS.. VALVES

A. W. CASH COMPANY
DECATUR, ILLINOIS

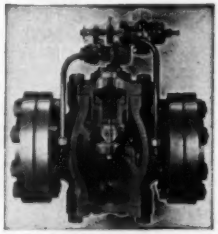
OTHER VALVES from the CASH STANDARD LINE



High Pressure Reducing Valve Type H-P: extra heavy for use with initial pressures up to 5000 lbs.; and for reduced pressures up to 650 lbs. Good for most fluids. Sizes: ⅛" to 2"; bronze body; nitralloy trim. Get Bulletin 931.



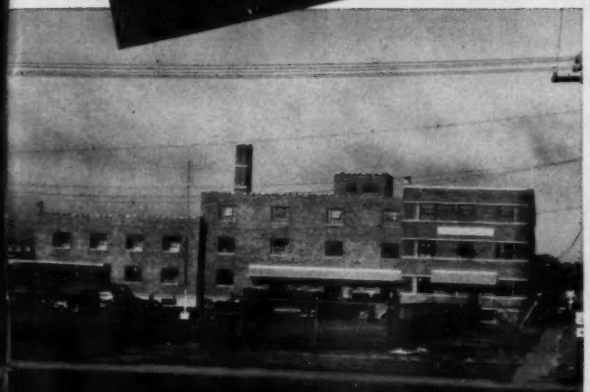
Type 8071 Pressure Regulator for dirty liquids (like Bunker C fuel oil). Inner valve is bolted to diaphragm for positive movement. Sizes ½" to 10". Bodies: iron, bronze, or steel. Seat ring and inner valve: stainless steel. Bulletin 972.



Cash Standard Type 10 Pressure Regulating Valve, pilot operated. (Pilot operating fluid discharges to outlet pipe; not wasted). Sizes: 2" to 12". Highest pressures: inlet 600 lbs.; reduced 250 lbs. Iron, bronze, or steel bodies; standard trims. For water, air, non-corrosive gases and oils. Get interesting Bulletin 966.

Now more important than ever to you...

Fast LOCAL delivery



Convenient LOCAL warehouses

On-the-spot LOCAL lubrication engineering

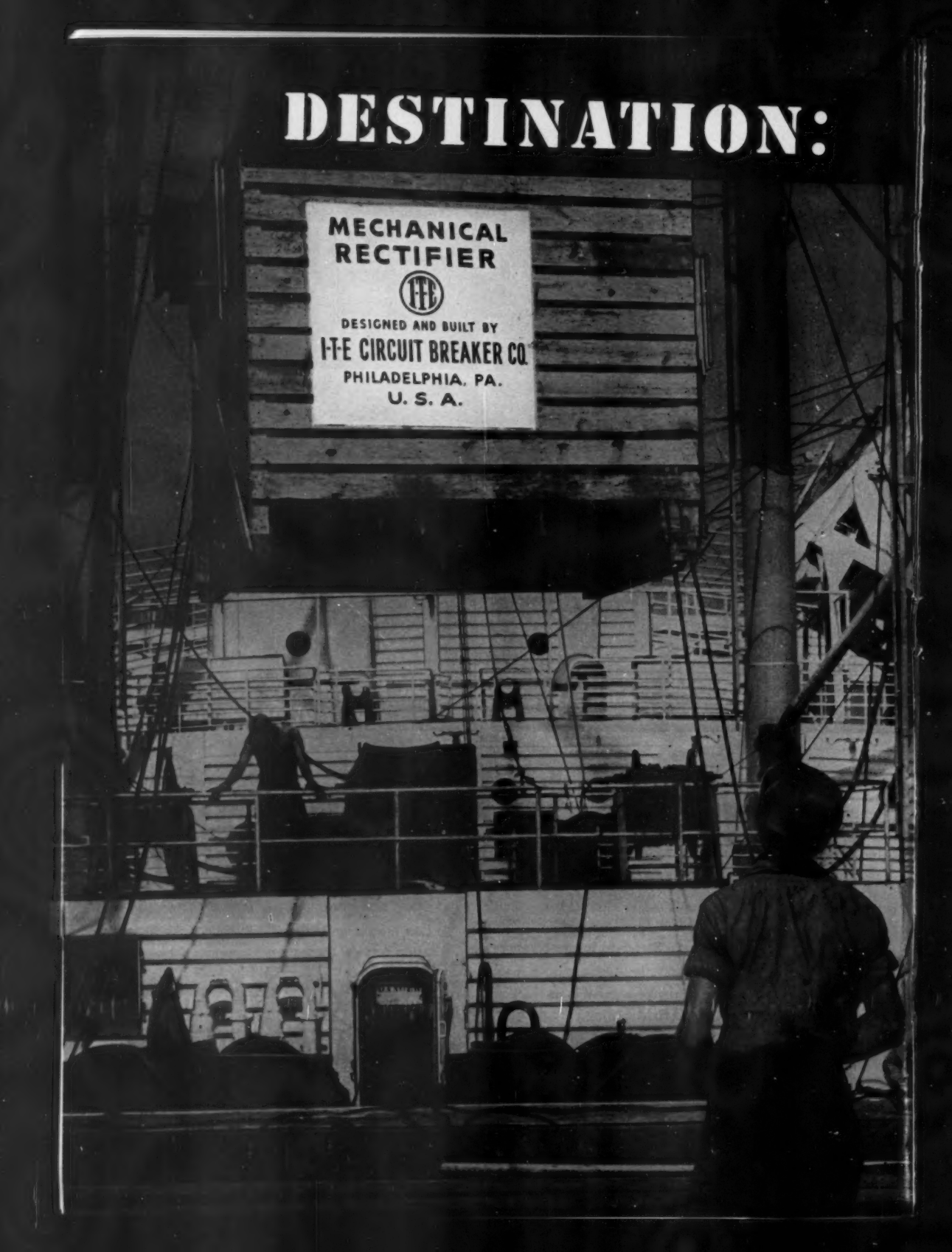
Standard's LOCAL Lubrication service

• Wherever you are located in the Midwest, there's a Standard service-supply center close at hand. That means prompt delivery of Standard products, immediate assistance from a Standard lubrication specialist.

There's no need to worry over possible production delays due to lack of the right cutting oil, lubricant, or fuel . . . no need to stock-pile these supplies in your own plant . . . no need to wait for help in solving your lubrication problems.

To take advantage of Standard's time-saving *local* lubrication service (now more important than ever to you) call the Standard office in your area. Or write: Standard Oil Company (Ind.), 910 South Michigan Avenue, Chicago 80, Ill.

STANDARD OIL COMPANY STANDARD (INDIANA)


DESTINATION:
MECHANICAL
RECTIFIER
I-T-E
DESIGNED AND BUILT BY
I-T-E CIRCUIT BREAKER CO.
PHILADELPHIA, PA.
U. S. A.

MANILA

I-T-E Mechanical Rectifier to Provide D-C Power for Philippine Chlorine Production

Otto Jensen (right), manager of the Rectifier Division, I-T-E Circuit Breaker Company, Philadelphia, explains cathode ray oscilloscope reading of contact timing on new mechanical rectifier installation for the Superior Gas and Equipment Company, Manila, Philippine Islands. Observing the demonstration are (left to right) D. Tiosejo, Vice President of the Philippine company; H. G. Noordberg, Vice President; and B. D. Van Eyck, Industrial Equipment Manager, Philips Export Corporation of New York.

PHILADELPHIA: A step toward making the Philippines independent of outside chlorine supplies was taken recently when the first I-T-E Mechanical Rectifier manufactured for export was shipped to Manila from the Port of Philadelphia.

The rectifier will be put into operation this fall in a new $700,000 chlorine plant near Manila. The plant will produce an estimated six tons of chlorine daily for water chlorination, bleaching, and civil defense purposes.

Designed to produce an uninterrupted source of d-c power for plant operation, the rectifying equipment has a rating of 12,000 amperes at 65 volts.

The rectifier was purchased through Philips Export Corporation, New York City, by the Superior Gas and Equipment Company, Manila, whose Chief Engineer and Director, M. I. Felizardo, and Vice President, D. Tiosejo, supervised acceptance tests at the I-T-E Philadelphia plant.

Deciding factors in Superior's selection of rectifying equipment were the mechanical rectifier's high inherent efficiency (96.6%), the small space requirement, low maintenance cost, and ease of operation.

I-T-E Mechanical Rectifiers are available in units rated from 4,000 to 10,000 amperes, in any voltage from 50 to 400 volts d-c. Primary voltages, 2,300 to 22,000, three-phase a-c.

I-T-E Bulletin 5106 contains complete technical information on the Mechanical Rectifier, including a detailed presentation of operating principles. Send for it today. I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pa.

The I-T-E Company

SAVE

You can now

Effective immediately, Westinghouse fluorescent lamps will be sold at new, greater discounts to quantity buyers. All types and sizes of fluorescent lamps come under this money-saving order: standard fluorescent tubes, slimlines, and circlines—you save on all!

In quality, these lamps remain unsurpassed! Their end-to-end brightness, their uniformity of color, and, above all, their dependable performance for thousands of hours add up to value that is not topped.

So, whether you buy a few tubes or a few thousand, whether you are a regular Westinghouse customer, or a prospect, take advantage of these important savings.

LIFE...

None burn brighter, none lasts longer than Westinghouse fluorescent lamps. For factories, stores, offices, schools or public buildings, their *lifetime* record is tops.

PERFORMANCE...

Since the introduction of Westinghouse fluorescent lamps, light output has been steadily increased, life lengthened, and price reduced. Today's new discounts are new, added proof of Westinghouse progress in lamp leadership.

VALUE...

Measured by any yardstick, whether quality of light output or lamp life, there's no better value for the money.

For details, call or write the Westinghouse sales office nearest you. See list at right. Westinghouse Lamp Division, Bloomfield, New Jersey.

CITY	ADDRESS	PHONE
Albany	454 N. Pearl St.	4-9135
Allentown	739 Hamilton St.	4-5108
Amarillo	301 Polk St.	7838
Atlanta	(Chamblee, Ga. 2200 Peachtree Ind. Blvd.)	21-3141
Baltimore	501 St. Paul Pl.	Plaza 0300
Birmingham	P. O. Box 1814 Homewood	2-7892
Boston	(Belmont, Mass., 30 Brighton St.)	BE 5-6020
Buffalo	814 Ellicott Sq. Bldg. Washington	3966
Charlotte	1908 Liberty Life Bldg.	4-6624
Chicago	Mdse. Mart Plaza	Whitehall 4-3060
Cincinnati	207 W. Third St.	Garfield 2250
Cleveland	1370 Ontario St.	Cherry 1-7600
Columbus	262 N. 4th St.	Main 5527
Dallas	209 Browder St.	Randolph 4161
Davenport	2212 E. 12th St.	3-2761
Dayton	32 N. Main St.	Adams 9153
Denver	910 15th St.	Keystone 8121
Des Moines	1400 Walnut St.	2-8244
Detroit	5757 Trumbull Ave.	Trinity 2-7010
Ft. Wayne	610 S. Harrison St.	Anthony 3421
Ft. Worth	1310 Electric Bldg.	Fortune 4066
Hartford	119 Ann St.	5-0851
Houston	1314 Texas Ave.	Charter 4691
Huntington, W. Va.	1029 7th Avenue	7146
Indianapolis	137 S. Pennsylvania St.	Market 3301
Kansas City	101 W. 11th St.	Harrison 7122
Little Rock	Woodrow & Roosevelt Rd.	5-2471

MONEY!

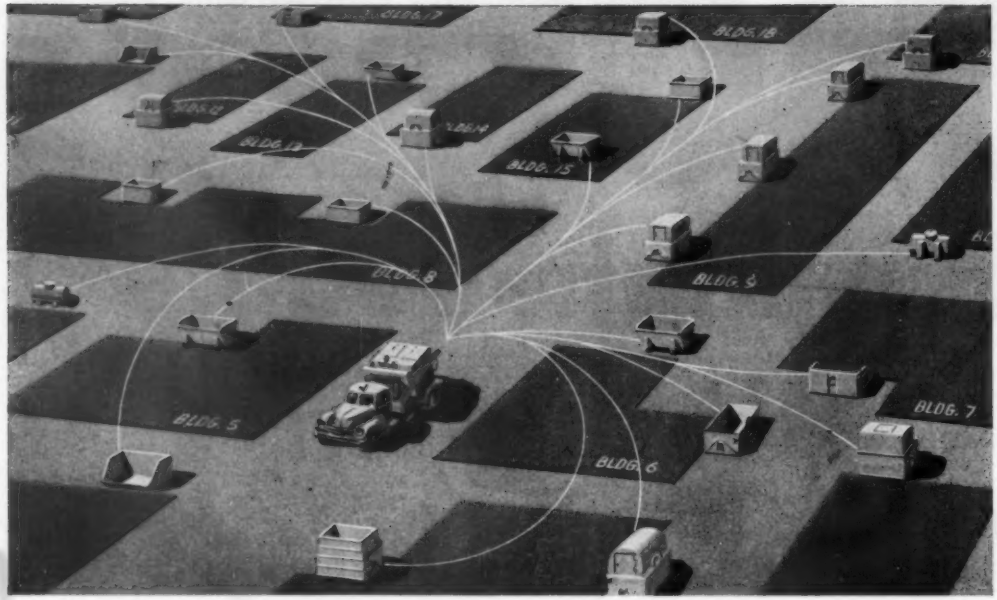
buy high-quality Westinghouse fluorescent lamps at NEW LOW NET PRICES

on quantity purchase

YOU CAN BE SURE...IF IT'S

Westinghouse

CITY	ADDRESS	PHONE
Los Angeles	600 St. Paul Ave.	Madison 6-3881
Louisville	332 W. Broadway	City 8953
Memphis	130 Madison Ave.	8-8546
Milwaukee	538 N. Broadway	Daly 8-1800
Minneapolis	727 2nd Ave., N.	Main 1471
Nashville	2908 Woodlawn Dr.	9-9960
New Haven	42 Church St.	5-3191
New Orleans	236 So. Saratoga St.	Tulane 8891
New York	40 Wall St.	Whitehall 3-4321
Newark	528 Ferry St.	Mitchell 2-3450
Oklahoma City	120 N. Robinson St.	7-1633
Omaha	117 N. 13th St.	Harney 8-700
Peoria	114 Callendar St.	8-533
Philadelphia	3001 Walnut St.	Evergreen 2-1200
Pittsburgh	337 Blvd. of Allies	Atlantic 1-8400
Pittsburgh	McKee & Leonard Sts.	Federal 1-9962
Portland, Ore.	309 S. W. 6th Ave.	Atwater 9464
Providence	51 Empire St.	Gaspee 1-8616
Richmond	1110 E. Main St.	2-4758
Roanoke	Kirk Ave. & 1st St.	6263
Rochester	1048 University Ave.	Monroe 1635
Sacramento	1720 14th St.	Gilbert 3-6525
Saginaw	124 S. Jefferson St.	Saginaw 4-2648
St. Louis	411 N. 7th St.	Central 1120
Salt Lake City	235 W. South Temple St.	5-3413
San Antonio	115 W. Travis St.	Garfield 5114
San Diego	961 6th Ave.	Main 8151
San Francisco	420 Bush St.	Exbrook 7-5353
Seattle	1208 Westlake Ave., N.	Garfield 2133
Spokane	1023 W. Riverside Ave.	Main 3294
Springfield	26 Vernon St.	6-8373
Syracuse	700 W. Genesee St.	2-1361
Tampa	405 Wallace S. Bldg.	7-4208
Tulsa	600 S. Main St.	3-3191
Washington, D. C.	1625 "K" St., N. W.	National 9043
Wichita	301 S. Market St.	5-9631
Wilkes-Barre	287 N. Pennsylvania Ave.	3-1144



★ Never Before Have You Been Able To Cut Bulk Materials Handling Costs So Drastically

Pictured above is a skeleton layout of a typical industrial plant using the Dempster-Dumpster System — one truck mounted Dempster-Dumpster handles the entire group of 26 Dempster-Dumpster containers of six different types. These big, detachable steel containers are like having 26 truck bodies for a single truck.

Any required number of Dempster-Dumpster containers are spotted at convenient materials accumulation points inside and outside your plant. They range in sizes up to 10 cu. yds. and are made in various designs to suit your particular needs. Materials — bulky, light, heavy, solids, rubbish and even liquids—are dumped or placed in these containers. The truck mounted Dempster-Dumpster makes scheduled rounds, picks up each preloaded container, carries it to the point of disposal, sets it down intact or dumps the materials and returns the container for refilling. The entire operation is hydraulically controlled and handled by only one man, the driver.

It is not unusual for one Dempster-Dumpster to eliminate up to 10 conventional trucks . . . reducing investment accordingly. This means cutting maintenance costs, tire and gas requirements tremendously. And, more important, it increases production with a minimum of manpower. It will pay you to investigate the Dempster-Dumpster System now! A product of Dempster Brothers, Inc.

Above, the Dempster-Dumpster is shown in the three simple stages of picking-up, hauling and dumping an 8 cu. yd. drop bottom container . . . completing the cycle in one to two minutes. These photos show the ease with which the Dempster-Dumpster handles all containers, regardless of their type, size or whether they are bottom or tilt dumping types.

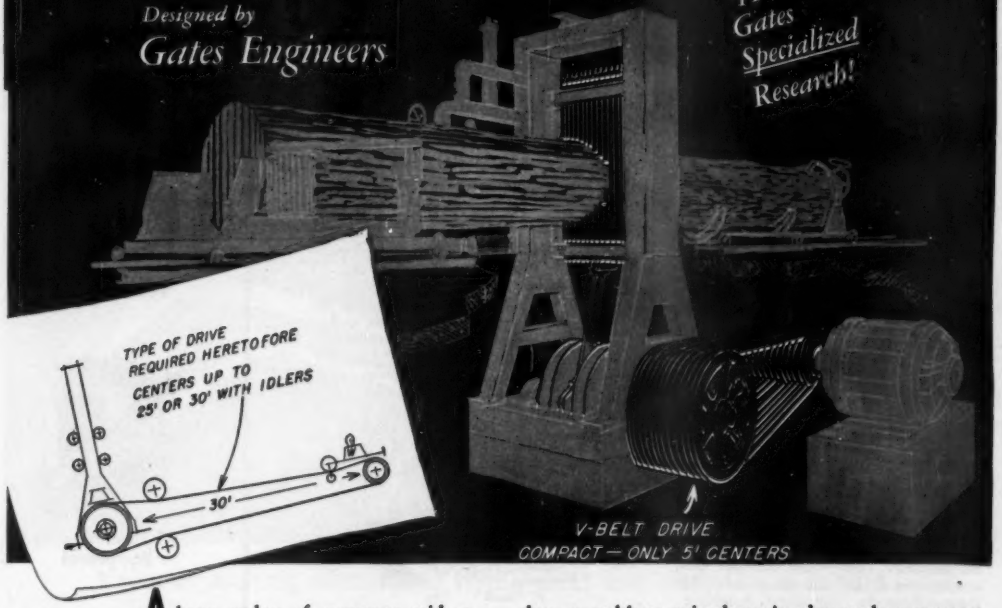
The important feature to remember is that only one truck-mounted Dempster-Dumpster and driver handles one container after another in an endless cycle, constantly on the move for economy and efficiency never before available in bulk materials handling.

DEMPSTER BROTHERS - 191 Shea Building - Knoxville 17, Tennessee

The first successful V-Belt Drive for GANGSAWS

Designed by
Gates Engineers

Another practical application of Gates Specialized Research!



A large maker of gangsaws said to Gates Engineers, "If you can design a V-Belt drive to handle the *fluctuating load* on a gangsaw, we can discard the long and troublesome flat belt that we have always thought we had to use."

The *reasons* for his statement are quickly told:—

A gangsaw (or Swedish type Gang Mill) consists essentially of several saw blades mounted in a heavy steel frame or "sash" that moves rapidly up and down like a monster jig saw. This sash may weigh a ton or more—yet it makes about *five* 24-inch *up* and *down strokes per second!*

On the *up* strokes, the saws have no cutting load on them. But on the *down* strokes they must often slash a log up to 36" diameter into 2" planks. This great unbalance in load between the *up* and the *down* strokes has heretofore defeated all efforts to apply a V-Belt Drive to saws of this type.

After thoroughly analysing the fluctuating load on gangsaws, Gates Engineers recommended very minor changes in design which would permit the application of V-Belts and—what is of *utmost importance to you*—they were able to write down *in advance* the exact specifications of the V-Belt Drive that has very successfully handled this extremely difficult assignment.

This *pre-solution* of drive design problems is possible because Gates operates the largest V-Belt testing Laboratories in the World—and Laboratory findings are carefully checked by tests made under actual field conditions. Finally, the *results* of these exhaustive tests are immediately reduced to *usable data* for the design of V-Belt drives to *perform whatever task may be required.*

Phone a Gates Field Engineer

If you have a difficult drive to design, or if some drive in your plant is giving trouble, or if you only want to be sure what size and construction of V-Belts will give the most efficient and the lowest cost service on any particular drive—you have only to phone a Gates Field Engineer, *always near you* in all industrial centers.

Just look in your phone book under "Gates Rubber." A Gates Field Engineer will come right to your plant and put at your service the full benefits of Gates V-Belt knowledge and experience *without the slightest obligation!*

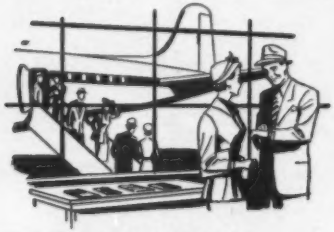
ENG. 515

Gates
Hose V-Belts
Molded Rubber Goods
for Industry

VULCO ROPE **DRIVES**
ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

American Blower...a time-honored name in air handling

Birmingham, Ala., has a conveniently located American Blower Branch Office to provide you with data and equipment for air handling. You can reach American Blower in Birmingham by calling 7-2383. In other cities, consult your phone book.



TEMPERATURES TAMED...

Passengers and employees alike appreciate the pleasant atmosphere created by American Blower Air Conditioning Units in a large southern air terminal. These units circulate cool, conditioned air and maintain comfortable temperatures the year round. American Blower Air Conditioning Units are widely used in commerce and industry to cool and dehumidify in summer, heat and humidify in winter. Users find this dual function by the same unit saves them money. May American Blower help you?

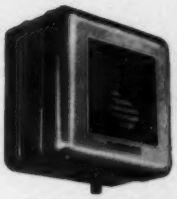
BAKER'S DELIGHT...

A large midwest bakery recently installed several smartly styled American Blower Ventura Fans in its new, modern plant. Result—cleaner, pleasanter working conditions, improved employee efficiency. Ventura Fans maintain air circulation by exhausting hot, stale air quickly and efficiently. They are ideal for ventilating shops, factories, offices, and in many other applications. All carry Certified Ratings and are sound-rated for quiet operation. Good ventilation is good business in your plants, too.

NOW IS THE TIME...

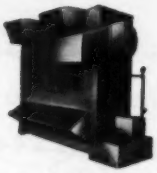
Plan now for winter heating. If your present heating system is inadequate or inefficient, replace or supplement it with American Blower Unit Heaters. These efficient Unit Heaters distribute heat evenly over a wide area, assure comfortable final temperatures everywhere. In many installations, American Blower Unit Heaters have paid for themselves in fuel savings alone within two to three years! Models for steam or hot water heating systems, also self-contained, gas-fired models.

Whether your needs are civilian or military, American Blower heating, cooling, drying, air conditioning and air handling equipment contributes toward improving over-all comfort and efficiency. For data, phone or write our nearest branch office.

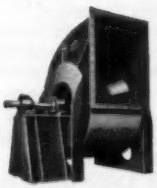


Unit Heaters

Ventura Fans



Air Conditioning Equipment



Industrial Fans

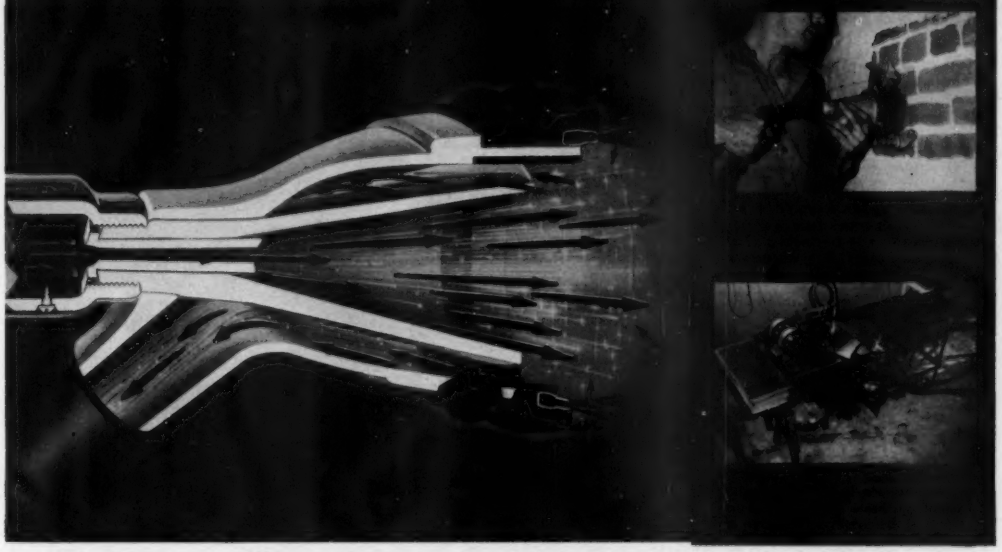
Utility Sets

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY AMERICAN BLOWER AIR HANDLING EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

REVOLUTIONIZES BLAST CLEANING!



Vacuum pick-up eliminates flying dust and dirt. Users report Vacu-Blaster soon pays for itself

"The savings of one year's cleaning of retorts will alone repay us the amount we have invested in your equipment."
Van Camp Sea Food Co., Inc.

"Paid for itself in a relatively short period of time." *Lee Rubber & Tire Corp.*

Here's the revolutionary new way to blast-clean metal, wood, concrete, brick. Exclusive vacuum pick-up eliminates flying dust and dirt, reclaims and re-uses abrasive. No mess to clean up. Important savings in time and labor. Portable—can be moved to any job.

Vacu-Blaster cleans tanks and tank cars, inside and out; removes rust and paint from ships and vehicles; edge-cleans sheets prior to welding; cleans floors, walls and ceilings of food processing and other plants. No dust or dirt to contaminate product or damage machinery.

Hundreds of satisfied users. Mail coupon for details about Vacu-Blaster—the only blast cleaner with a vacuum pick-up.

Demonstration can be arranged!

2294

Write for FREE BOOKLET!

Vacu-Blast Co., Inc., 563 Peninsular Ave., San Mateo, Calif.
We would like your free Vacu-Blaster catalogue____ Wish to arrange for demonstration____ Our problem is_____

Name_____ Position_____
Company_____
Address_____

AMERICAN MONORAIL CRANES

for **constant service**

Flangeless wheels with precision bearings eliminate all wheel friction.
Load bar is seated in saddle trunnion on Timken self-aligning bearings.
Side rollers with anti-friction bearings hold trolley in positive rail alignment.
Side plates rotate independently around saddle trunnion on bronze bushings which equalize pressures on all wheels.
End truck supporting saddle is seated on Timken self-aligning bearings.

Only two men are needed to transfer bundles from shipping rooms directly into gondola cars — a saving of 32 man-hours per shift over previous method. This crane is in constant service. The secret of its success is Articulated Trolleys.

When each trolley wheel carries its share of the load in perfect alignment with the craneway tracks and all possible friction is eliminated, the result is perfectly articulated trolley travel.

Applied to American MonoRail Cranes, these articulated trolleys permit constant operation—handling loads up to 10 tons. And with this is offered all the flexibility of MonoRail design for interlocking carrier service between and beyond the craneways.

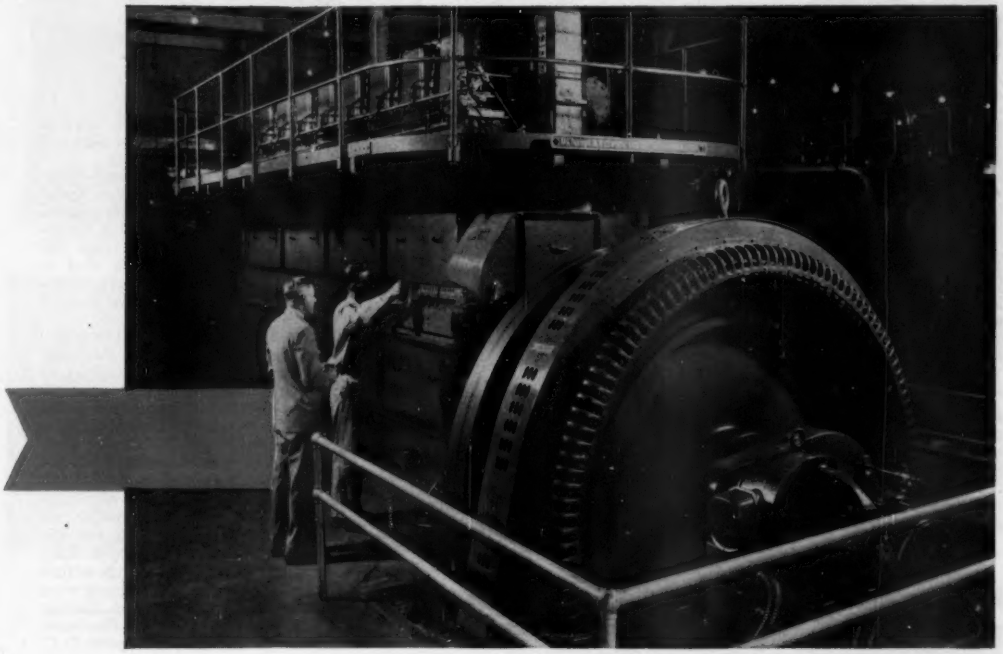
Let an American MonoRail engineer explain all the advantages of these new cranes, or write for complete information.

THE AMERICAN MONORAIL COMPANY

13123 ATHENS AVENUE **CLEVELAND 7, OHIO**

Is there room for improvement in your Diesel engine lubrication?

—call in a GULF LUBRICATION ENGINEER



There's no better source of help on any problem that involves lubricants, lubrication, or maintenance of stationary Diesel engines than a trained Gulf Lubrication Engineer.

Gulf Lubrication Engineers are experts in petroleum technology—they are familiar with refining processes, additives, and the past performance records of various types of lubricants. They completely understand the effect of different operating conditions on lubricants. And, just as important, they know the lubrication requirements of all types of Diesel units and auxiliary equipment.

The application of this knowledge and experience to each individual problem helps reduce maintenance costs for power plant equipment.

To get the benefits of this expert engineering service for your plant, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh 30, Pennsylvania.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Tailor Shop on Wheels

A TAILOR SHOP on wheels at Convair's San Diego Division turns out stunning custom-made originals, but they are designed exclusively for the B-36 bomber trade.

The Air Force's intercontinental bombers, built at Consolidated Vultee Aircraft Corporation's Fort Worth Div., are undergoing certain modifications at San Diego. A part of this program is replacing the

With one plane done, the tailor shop is moved on to service the next plane

more than 150 different sized panels of flame-proof wool which snap onto bulkheads inside the ship. These help to soundproof the pressurized forward and aft cabins.

Because each bomber is slightly different in interior arrangement to meet special requirements, each panel must be tailor-made to fit snugly around instruments, door handles, and openings. To save time the tailor shop moves in close to each plane along the line. After three and a half days of busy cutting and stitching, the crew of 23 tailors (divided into two shifts) turns out what they call the "best dressed plane in the world."

When finished with one plane the women stand aside while the men put their shoulders to the wheel and move on to the next "customer." *From Convairiety, a publication of Consolidated Vultee Aircraft Corp., San Diego 12, Calif.*

Expanded Shale Concrete

SOLUTION of many engineering problems is facilitated by the use of a structural expanded shale aggregate concrete. The aggregate, combining lightness with strength, has greatly widened the range of uses for concrete, and in many cases it has been found economical to replace ordinary concrete with this lightweight concrete.

Expanded shale aggregate does slightly increase the initial cost of concrete, but this additional cost is more than offset by its advantages. Its use reduces the dead weight of

Lightweight expanded shale concrete slabs are installed on roof of pipe mill

concrete from one-half to one-third. It increases the insulation value from four to five times, and is more fire resistant and more shock resisting. Its greatest virtue from the standpoint of economy is that it makes possible a substantial reduction in the amount of steel needed in buildings.

Foundation problems in particular have caused wide use of this type of concrete. The Halle Building of Cleveland offers a specific example of how one kind of foundation problem was solved. The weight of the proposed building, if ordinary concrete had been used, would have required footings that would have necessitated going into adjoining property. This was not possible, so the weight of the building was reduced by the use of expanded shale concrete and smaller footings within the limits of the property lines were used. *From an article by George Bickel, in The Military Engineer, July-August 1951, Washington, D. C.*

Recommended Survival Kit for Plant Civil Defense

Photo: Marsak Films

Kit includes bottled water, first aid equipment, grease-cutting soap to wash off radioactive particles clinging to the skin, canned goods and cooking stove. Also desirable would be a flashlight, extra clothes, candles, matches, Red Cross handbooks and portable radio from which civil defense information may be heard

Grease Tester

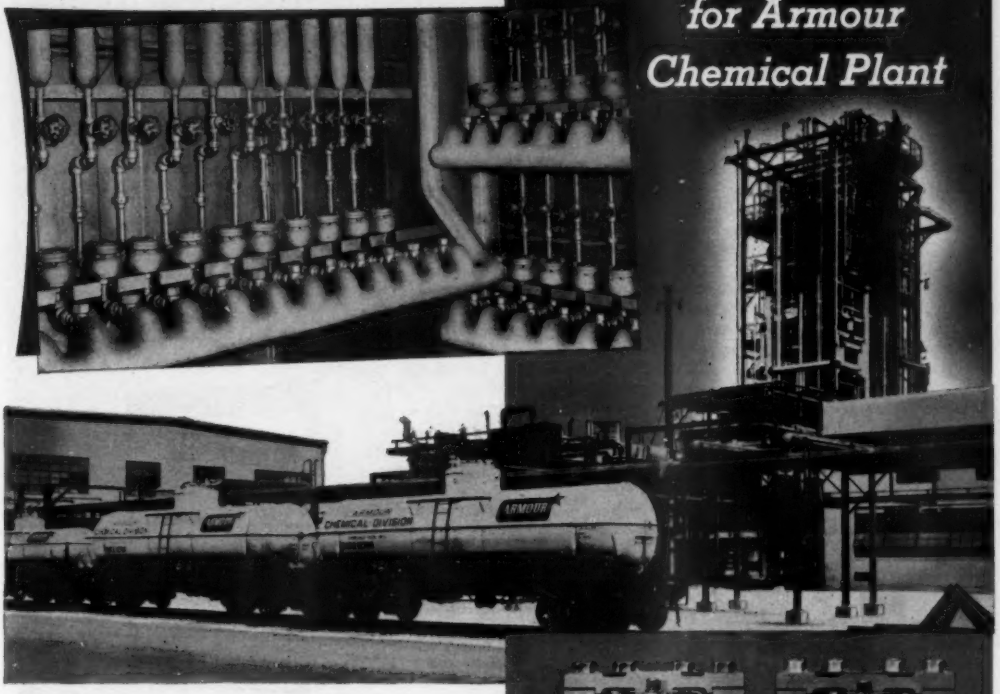
AN ELECTRIC MOTOR grease tester was designed and constructed at the Naval Engineering Experiment Station, Annapolis, Md., to test shipboard electric motor greases for large bearings operated at slow speeds under heavy loads.

The apparatus consists of 30 individual test units mounted on two test stands, with controls and records centralized in a control panel. Each unit contains a separately driven test bearing in an individual oven with independent temperature control. Thrust and radial loads are applied by means of springs. The temperature of the test bearing is recorded and controlled from thermocouples by potentiometer instruments mounted on the control panel.

The use of springs for loading provides a wide range of loads without numerous weights or levers and, with the use of adapter bushings, the tester can accommodate several

NICHOLSON TRAPS SELECTED

for Armour Chemical Plant



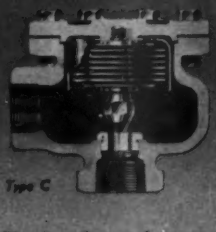
Above, new McCook, Ill., plant of Armour and Company's Chemical Division. Nicholson steam traps were specified throughout. Left above, a battery shown on tracer lines warming fatty acids.

Many chemicals are made available in commercial quantities for the first time by this new Armour Chemical Division plant. With demands for process steam alone as high as 80,000 pounds per hour, the entire plant is equipped with Nicholson steam traps, both grounds and buildings.

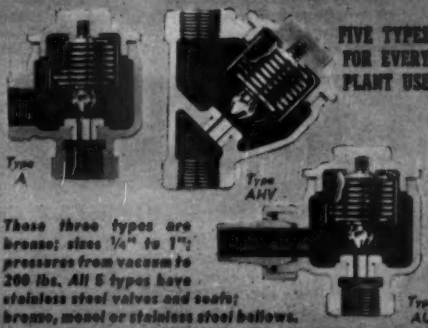
Features of Nicholson thermostatic steam traps: 2 to 6 times average drainage capacity; shorten heat-up time. Operate at lower temperature differential; fast action keeps equipment full of live steam. Maximum air-venting capacity. Freeze-proof. Types for every process, power, heat application.

Send for NICHOLSON TRAP CATALOG 751

Catalog 751 contains capacity tables, installation diagrams, and data, charts and formulae for determining the proper size trap.



The two types above are cast iron; sizes ½" to 2"; pressures from vacuum to 225 lbs. Type C also in cast steel for pressures to 300 lbs.



These three types are bronze; sizes ¼" to 1"; pressures from vacuum to 200 lbs. All 5 types have stainless steel valves and seats; bronze, monel or stainless steel bellows.

W. H. NICHOLSON & CO.

208 OREGON ST., WILKES-BARRE, PA.

Sales and Engineering Offices in 57 Cities

New, Fast-Acting, Automatic

"SMOKE-FIRE DETECTIVE"

For Air Conditioning

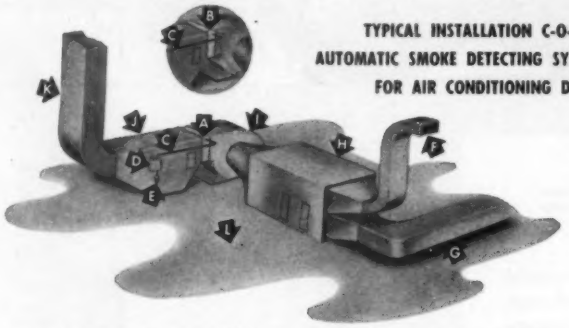
Smoke in your air conditioning spreads fast... causes panic, extensive spoilage and needless expense... now all can be avoided by installing a modern, fully approved C-O-TWO Automatic Smoke Detecting System.

Smoke, smoldering and fire are spotted in the incipient stage anywhere throughout the air conditioning ducts, as well as via the return air from air conditioned spaces. Four types of smoke detectors and several different installation arrangements are available to fit your particular needs... for small air conditioning units, for large air conditioning systems, and whether with or without electrostatic precipitators. All C-O-TWO Automatic Smoke Detecting Systems function by drawing continuous air samples through simple piping to a smoke detector. The first trace of smoke sets off an alarm, based on an exclusive operating principle... no chance of smoke spreading... the air conditioning instantly shuts down, dampers close and fire extinguishing systems actuate.

Act now for complete free information and descriptive literature on this newest contribution to modern fire fighting. An expert C-O-TWO Fire Protection Engineer will be glad to help you in planning up-to-date, economical, fully approved fire protection facilities for your air conditioning without obligation.

(Special assistance rendered to qualified air conditioning contractors.)

TYPICAL INSTALLATION C-O-TWO AUTOMATIC SMOKE DETECTING SYSTEM FOR AIR CONDITIONING DUCTS



A perforated smoke accumulating pipe
B smoke accumulating pitot tube (alternate)
C pipe line for carrying continuous air samples to smoke detector
D smoke detector
E audible alarm
F fresh air intake and duct
G return air duct
H air cleaning unit
I air fan
J air cooling and heating unit
K supply air duct
L floor level

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

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Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

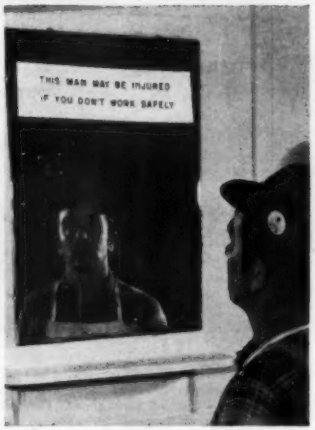
Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

bearing sizes. It can handle bearings ranging in bore from 30 mm to 60 mm, and can provide radial loads up to 1000 lb.

Silicone grease, currently being investigated, has withstood 400 F for 400 hours before breaking down.

Operation of the various testers at the experimental station has shown that the majority of failures occur on starting after a shut down and cooling period. This is explained by the fact that frequently an oxidized grease will be sufficiently fluid for lubrication while at operating temperature, but at room temperature will be too hard to permit lubrication during the starting period. Hence, a daily shut-down will permit early detection of such a condition. *From a news release of Public Information Officer, Naval Engineering Experiment Station, Annapolis, Md.*

Here's a Safe Reflection

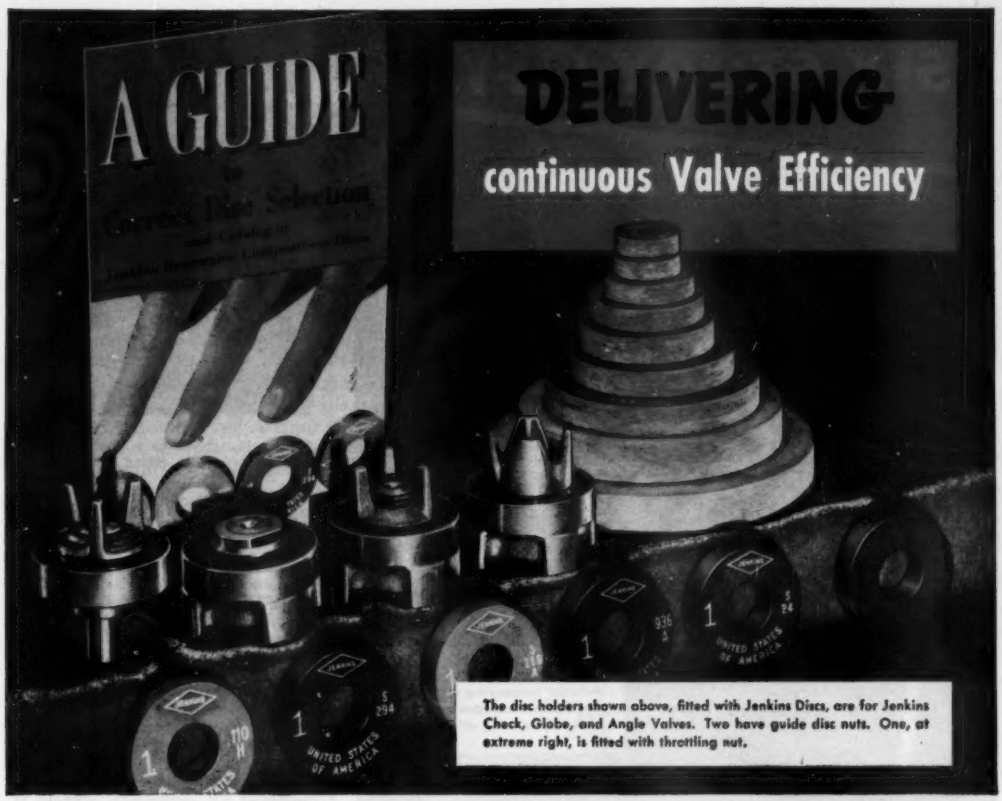


This mirror-reminder informs employees —particularly you—to be safety-conscious. (From News Pictorial, publication of Johns-Manville Corp., N. Y.)

Jet Tappers Used on Open Hearth Furnaces

STEEL PLANTS are using a new, safer method of tapping open hearth furnaces by means of small charges of explosives. Formerly, in order to start the molten steel flowing from the furnaces, the open hearth crew had to drive out the hard crust in the tap hole at the rear of the furnace by manipulating a long bar through the furnace. The new method frees the men from this manual labor.

The tapper consists of a 2 oz explosive charge enclosed in a plastic case. It is detonated by a special high temperature electric blasting cap situated in a well in back of the plastic case. The tapper and electric blasting cap are supplied as separate units and must be assem-



The disc holders shown above, fitted with Jenkins Discs, are for Jenkins Check, Globe, and Angle Valves. Two have guide disc nuts. One, at extreme right, is fitted with throttling nut.

Now, when *continuous valve efficiency* is vital . . . you can rely on readily available Jenkins Renewable Composition Discs to provide the valve protection that greatly extends service life. Proper disc selection and replacement in time guard against premature wear, can multiply the original efficiency of valves many times over.

Disc replacement is simple and easy, can be done without removing valves from the line. To save more time, maintenance-wise valve users keep on hand a stock of disc holders fitted with the discs most commonly used.

Only Jenkins makes *both* Valves and Discs

Originator of the first successful Renewable Composition Disc, Jenkins Bros. has continued to set quality standards. That's why you can rely on your Jenkins Distributor for discs of time-tested design and composition, plus authoritative disc information.

Ask your Jenkins Distributor for the folder, "A Guide to Correct Disc Selection" . . . also the "Jenkins Disc Selector", a handy wall chart listing recommended discs for all common services, temperatures, and pressures. Or write Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal.

Sold through leading Industrial Distributors everywhere

Money-saving idea for disc-valve maintenance

Keep on hand a stock of disc holders fitted with the discs most commonly used. This permits quick replacements, saves valuable time.

Slip off the disc holder with the old disc, and slip on another containing the new disc.
When you have time, reload the old disc holder with a new disc.

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

SIX STORY LIFT...

DRACCO Pneumatic Conveyor installation transporting salt, bone-black, ground limestone and bone-meal to processing storage silos.

at 12 tons per hour!

The positive, continuous, high-speed action of DRACCO PNEUMATIC CONVEYORS transports all types of dry granular materials with maximum efficiency.

Walls, floors and vertical heights present no obstacle to DRACCO PNEUMATICS—and they require only the space of a 6-inch pipe. They handle all materials in a completely enclosed system, eliminating dust hazards, contamination, or material losses. They also reduce labor and maintenance costs to a minimum and permit buying of materials in low-cost bulk form.

DRACCO engineers, with over 35 years experience in reducing materials-handling costs, will gladly show you how DRACCO PNEUMATICS can increase your materials-handling efficiency. Call or write DRACCO CORPORATION, 4063 E. 116th St., Cleveland 5, Ohio, or 415 Lexington Ave., New York 17, N. Y.

AGENTS IN PRINCIPAL CITIES

CLEVELAND **DRACCO** NEW YORK

PNEUMATIC CONVEYORS

DUST RECOVERY EQUIPMENT • METAL FABRICATION

bled together with a loading pole before use. The loading pole is a spiral-wound paper tube 8 ft long.

In operation, the tapper is placed in the runner with the connector cord still coiled and shunted, but detached from the loading pole. The

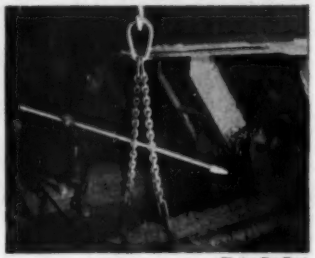


Photo: Du Pont

Tapper is carried to runner with connector cord still coiled and shunted, but detached from the loading pole

tapper is inserted until it contacts the facing. The loading pole is then dropped into the runner, and the shunt is removed from the connector cord and plugged into the receptacle located on the back of the furnace. The operator then retires to the firing station and inserts the key into the blasting machine. With his left hand on the interrupter switch, he twists the blasting machine handle to fire the charge. When detonated, the device throws a high velocity jet of metal fragments. Projectile action rather than blast effect opens the hole. The hole is continually deepened by successive impacts of the fragments until the jet is exhausted. *From Steel Facts, published by American Iron and Steel Institute, New York.*

Replacing Worn Shaft Sleeves On Centrifugal Pumps

AFTER CENTRIFUGAL pumps have been in service over a period of time it is oftentimes desirable to replace the worn shaft sleeves in order to cut down excessive gland leakage and minimize the wear on the packing. In removing the rotating element from the casing and the shaft sleeve nuts from the shaft, you may find the sleeves worn so thin that some leakage has reached the shaft proper causing some corrosion. Where this occurs, care must be taken in removing the old sleeves in order to protect the shaft.

If this occurs where up-to-date machine shop facilities are available, all necessary tools and aids are at hand. In cases where these facilities are not available, it has been found that a lead maul, a strap wrench, a spanner wrench, a can of penetrating oil and a few sheets of fine emery paper will fill the bill. These tools plus a mechanic's pa-

(Continued on page 31)

quicker maintenance

not less maintenance

is the ANSWER to RISING COSTS!

A lighting system is no better than its MINIMUM light output in daily service. Today's rising costs, however, may tempt one to sacrifice some of this light by reducing frequency of maintenance. Less maintenance may cost you from 10 to 40% of the light paid for!

The answer to rising costs is QUICKER MAINTENANCE, not LESS maintenance when you specify "Turnlox" reflector equipment. These detachable lamp holders minimize the need to cut maintenance schedules for the sake of cutting costs, because they *cut the time* required for cleaning and re-lamping. The simplified construction of these bayonet-type couplings actually encourages a more consistent lamp replacement and reflector cleaning program.

"Turnlox" eliminates the hazardous, time-consuming chore of cleaning reflectors or changing lamps from a stepladder. Just a twist removes the entire reflector assembly, lamp and all, for easy maintenance on the ground or at a bench.

Write for FREE DATA BULLETIN with details and specifications on the eight different Benjamin "Turnlox" Lighting Units available. Benjamin Electric Mfg. Co., Dept. PE, Des Plaines, Ill.

A slight upward pressure, and less than a quarter turn to the left, and both reflector and lamp are released from wiring terminal base in hood! It is just as simple to put back up—turn right and reflector is secured! Self-cleaning contacts!
BENJAMIN
RLM

Specify **BENJAMIN**

"*Turnlox*"

DETACHABLE REFLECTOR EQUIPMENT

Sold Exclusively Through Electrical Distributors

5/0 BENJAMIN

There's a Benjamin "*Turnlox*" Unit for every Incandescent Lighting Requirement!

Speed Up Reflector Cleaning and Maintenance

B-50798

Where corrosion is severe . . . wire your plant with

Rome Synthinol® 901

THERMOPLASTIC INSULATED WIRES AND CABLES

Underwriters' Approved for 600 Volts

Exceptionally resistant to corrosion, heat, moisture

Corrosive fumes, heat and moisture soon eat away ordinary insulations . . . resulting in costly "down-time." You can avoid this expensive lost production with Rome Synthinol 901 insulation.

Rome Synthinol 901 is a polyvinyl chloride type of thermoplastic insulation specifically made for feeder and branch circuit, as well as, equipment wiring in chemical plants, paper and steel mills, refineries . . . in fact, any installation where difficult conditions exist. Its high resistance to heat, moisture, acids, alkalies, corrosive fumes, oils and greases means longer life and greater safety factor.

Rome Synthinol 901 gives permanency to your wiring plans. Available in standard range of sizes with permanently clear colors. For complete information mail the coupon below.

Copper wire mill products are a Controlled Material under N. P. A. Controlled Materials Plan. USE CMP ALLOTMENTS PROMPTLY.

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Corporation
ROME · NEW YORK
From Bar to Finished Wire

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(Continued from page 28)

tience are all that are necessary to do a good job of removing the worn sleeves without damaging the shaft.

The first step is to apply penetrating oil at the point where the sleeve contacts the hub of the impeller, where the shaft nut has been removed and at any spot where the packing has broken through the sleeve. Apply more oil from time to time to get as much penetration as possible. While the oil is working, use the strap wrench to try to turn the sleeve on the shaft. A strap wrench is more desirable than a pipe wrench as it will not cut into the worn, thin shaft sleeve and score or scratch the shaft.

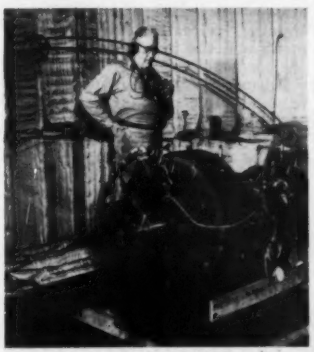
While trying to turn the sleeve on the shaft with the strap wrench, slight taps on the sleeve with a small lead maul may help to break loose the corrosive particles that are holding the sleeve tight to the shaft.

After the worn sleeve has been removed, the shaft should be cleaned by wiping it with an oily rag and the corroded spots rubbed down with the emery cloth. This makes replacement of the new sleeve easier. *From Goulds News, a publication of Goulds Pumps, Inc., Chicago 4, Ill.*

Quilt-Rooms Detect Sound

YOU CAN LITERALLY hear a pin drop in the new Naval Acoustical Laboratory at Annapolis, Maryland. This achievement in sound detection was made possible by the combination of a new idea in soundproofing and a unique building design.

The principal achievement is the creation of an accordion form for absorbing sounds. This form consists of fiber glass sheets 8 ft wide and of various lengths. This glass blanket is wrapped around a collapsible steel framework which, when opened, resembles a string of V-shaped decorations. The interior of the room presents a quilt like appearance.



Equipment is tested in soundproof surroundings. Quilt-like interior and unique building design make this possible

DARTS give a TIGHT JOINT

Without Excessive Wrenching!

Brutal wrenching is never necessary with a Dart Union. Both bronze seats—accurately machined then spherically ground—have wide, true-bearing surfaces that always give a drop-tight joint. No need to jam a Dart; no need to question but what it will stay tight.

And, because body and nut are made of practically indestructible, high-test, air-refined malleable iron, you can be sure they'll laugh off rough abuse—give the vital joint the ultimate in protection.

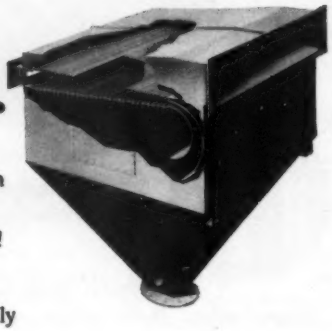
Little wonder Darts are first choice of shrewd buyers coast to coast.

DART UNION COMPANY
Providence 5, Rhode Island
The Fairbanks Co.— Distributors
Boston New York Pittsburgh

DART UNIONS

"What?... an efficient Dust Collector designed especially for small boilers from 100 to 2000 BHP?"

THERE SURE IS...



The *new* Buell 'LR' Fly Ash Collector gets 99% of all 100-mesh cinder discharge!

Boasts draft loss so low, you can even use it effectively on natural draft boilers!

For full information on how the Buell 'LR' Collector can help solve your Fly Ash Problem, write today to: Buell Engineering Company, Dept. 14-1, 70 Pine Street, New York 5, N. Y

buell®

Engineered Efficiency in **Fly Ash Collection**

Another construction feature which helped make this soundproofing possible, was the inverted building. The building is constructed inside out, with the interior suspended from outside structural supports. The framework of the building is actually its exterior. This design eliminates dead spaces between columns which are erected outside of a 16 in. concrete wall. This construction provides a solid interior with a perfectly flat surface. The same effect is attained in the ceiling by suspending the roof from beams rather than resting the roof on them.

The new laboratory has three testing rooms, in any one of which it is possible to record virtually the lowest and highest sound frequencies without interference. Tests can be run simultaneously in one of the three rooms with little possibility of sound interfering with tests in the other two. *From a news release of Department of Defense, Office of Public Information, Washington 25, D. C.*

Preventing Electric Motor Failures Due to Moisture

AN ANALYSIS OF electric motor failures due to moisture was made by the Hartford Steam Boiler Inspection and Insurance Co. for the year 1949. Possibly, some of the information obtained from the study will be of value in eliminating any future accidents.

The study revealed that careless handling of liquids was responsible for a large portion of the failures. Many resulted from wetting the motors during clean-up operations in plants where floors must be frequently washed with water. Overflowing water softener tanks, filters, dye tubs, or other liquid reservoirs of various kinds caused burnouts, many of which could have been eliminated if the vessels had been equipped with overflow drains.

Protection against these careless accidents will depend on conditions of the individual plant. Possible means of prevention are: personnel training, relocation of the equipment, and the installation of totally enclosed motors.

Adequate plant maintenance could have eliminated another group of accidents on the list. A common source of trouble was leakage of packing glands of motor-driven pumps. Other motors failed as a result of the damp atmosphere which surrounded them in poorly ventilated rooms or pits where leakage from boiler feed pumps, condensate equipment, or other apparatus gave off vapors which kept the air continually moist. Correction of accident producing conditions such as these is usually a simple matter of plant maintenance.

(Continued on page 38)

WHERE WILL THEY ATTACK IN YOUR PLANT?

MACHINERY STORED OUTDOORS
Problem
Corrosion
Answer
Insul-Mastic Vinyl System

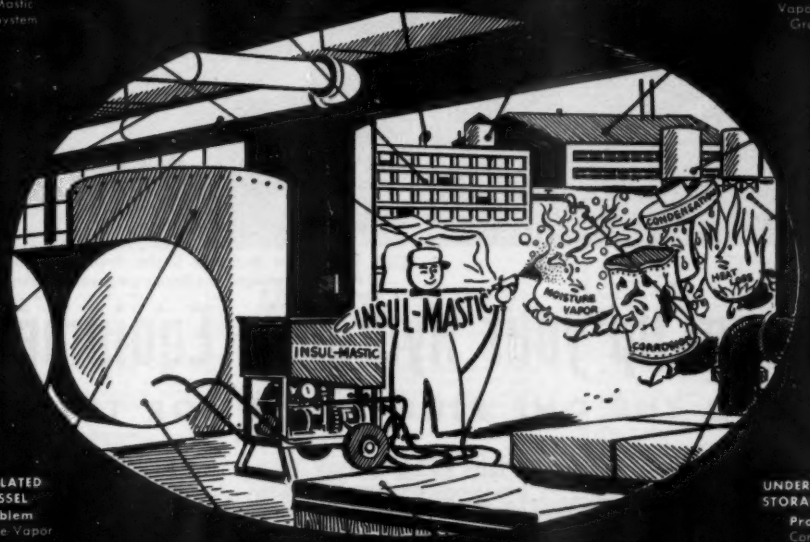
LEAKING WALLS
Problem
Moisture
Answer
Insul-Mastic Vaporseal & Granules

CORROSIVE VAPOR OUTLET
Problem
Corrosion
Answer
Insul-Mastic Vaporseal

WATER TANK
Problem
Corrosion
Answer
Outside—Insul-Mastic Vaporseal
Inside—Insul-Mastic Vinyl

LEAKING ROOF
Problem
Moisture
Answer
Insul-Mastic Vaporseal & Granules

WARM AIR DUCT
Problem
Heat Loss
Answer
Insul-Mastic Type "D"



MODERATE TEMPERATURE STORAGE TANK
Problem
Heat Loss and Corrosion
Answer
Insul-Mastic Type "D"

INSULATED PIPE
Problem
Moisture Vapor Penetration
Answer
Insul-Mastic Vaporseal

STRUCTURAL STEEL
Problem
Corrosion
Answer
Insul-Mastic Vaporseal

INSULATED VESSEL
Problem
Moisture Vapor Penetration
Answer
Insul-Mastic Vaporseal

ACID TANK
Problem
Corrosion
Answer
Insul-Mastic Vaporseal

CRATES AND CARTONS FOR OVERSEAS SHIPMENT
Problem
Moisture and Salt Air
Answer
Insul-Mastic Packaging Glues

COLD WATER INTAKE PIPE FOR BOILERS
Problem
Condensation
Answer
Insul-Mastic Type "D"

UNDERGROUND STORAGE TANK
Problem
Corrosion
Answer
Insul-Mastic Vaporseal

PROTECT YOUR EQUIPMENT WITH
INSUL-MASTIC
COATINGS OF UNEQUALED QUALITY

You can't select a heavy coating of better quality than Insul-Mastic. Its ingredients were specially chosen for their stubborn resistance to acids, alkalis, weather and wear. Insul-Mastic is homogenized for smooth spraying without blobs or pinholes. *Write today for our catalog.*

Think first of the coatings that last!

Insul-Mastic Corporation
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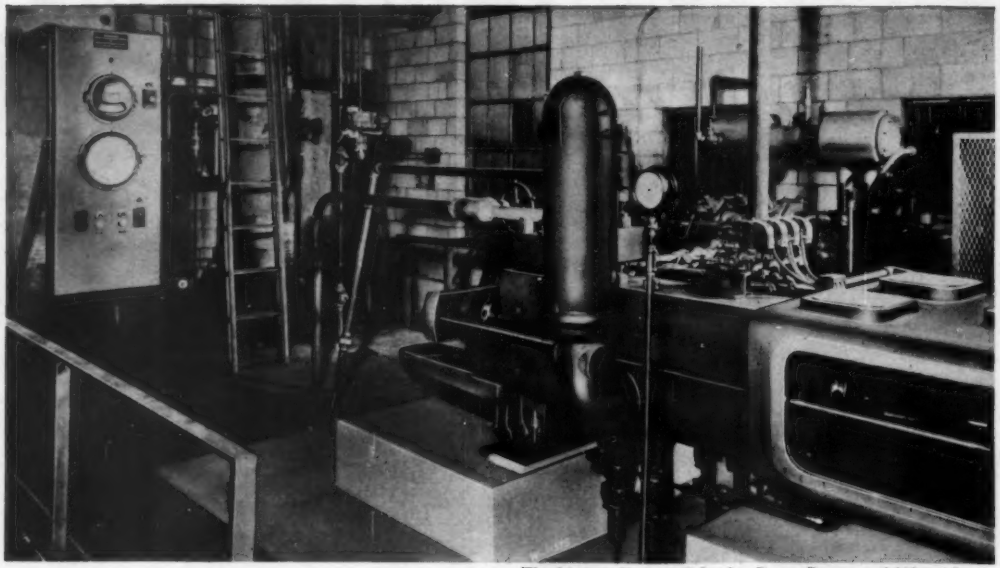
Representatives in Principal Cities



Worthington Horizontal Duplex Power Pump on 6,000 psi hydraulic system operating forging presses at Erie Forge Co., Erie, Pa.

Team up your Hydraulic Equipment

WITH THE ONE RIGHT PUMP FOR THE JOB

SAVE POWER, SPACE, LABOR

The pump in this picture is the "heart" of a centrally-controlled hydraulic system—powering a number of machines.

With such a system, this plant benefits from: increased overall operating efficiency and economy • concentration of hydraulic operations in a few pieces of equipment • convenient and simplified operation • use of water rather than inflammable or toxic liquid.

Complete Line—of Pumps, of Auxiliaries

The pump is a Worthington. It happens to be a horizontal duplex power pump. On another job, it might have been a high-speed vertical. Or, for larger capacity: a centrifugal pump. Or a steam pump. Or rotary. Whatever kind of pump the job calls for, Worthington *has* the right pump.

That's *one* big advantage in doing business with Worthington—the broadest range of pumps assures you the right one for each job.

Another advantage: Worthington can help you with *other* phases of the installation—for example: selection of proper design and size of high-pressure accumulaters and auxiliaries, system controls such as the Worthington suction valve unloader.

If *you* are planning a new or enlarged hydraulic system, Worthington's unequalled experience in hydraulics plus the wide range of Worthington equipment will help you *beforehand* to plan all these important factors in the installation.

For Descaling, Too

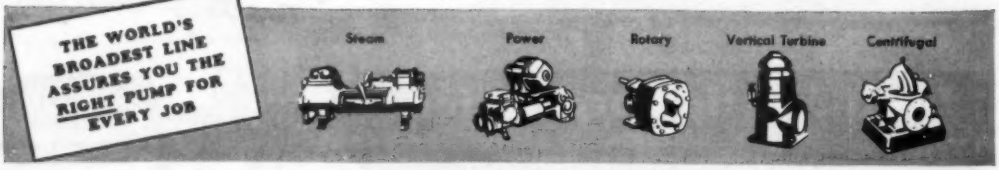
Ask us about the use of Worthington pumps on descaling of billets, sheets, plates, small parts. Descaling saves waste, saves wear on tools, reduces damage to dies in forging, improves the quality of the product.

For further information proving *there's more worth in Worthington* write to Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, N. J.

WORTHINGTON

P.1.2

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



BULLETINS just released and of immediate plant interest

MECHANICAL POWER TRANSMISSION

101 Magnetic Drive Engineering Data—Publication 1107 is a 32-pp booklet discussing precision speed control with the adjustable-speed magnetic drive. Technical in scope, it contains complete information both on the magnetic drive and company's new magnetic amplifier regutron speed control. Data is clarified through the use of charts and diagrams. A fully illustrated section is also included covering industrial applications of the drive, control. Electric Machinery Mfg. Co.

102 Chain Drives and Conveyors—"Installation, Operation and Maintenance of Chain Drives and Conveyors," is a 36-pp pocket-size text telling how to get the most service from sprocket chains. Explanations are brief, illustrations show right and wrong ways of solving chain problems. Stresses theory that no chain gives complete satisfaction unless used properly and given periodical inspection, lubrication and adjustment. Tells how to assure longer life, smoother operation and low over-all cost from sprocket chains. Includes check chart of "cures for sick chains." Chain Belt Co.

103 Worm Gear Drives in Action—Illustrated and described in this 8-pp bulletin are some installations of this manufacturer's worm gear drive units. Among them are the Type CU built to take the punishment of cooling tower service, a fan-cooled reducer that's especially suggested for use where space and weight are at a premium, and a special unit designed for driving a woolen card. The Cleveland Worm & Gear Co.

INSTRUMENTS AND CONTROLS

104 Grain Moisture Meter — Bulletin 1242U describes and pictures manufacturer's rapid electric moisture tester for grains, the Tag-Heppenstall Moisture Meter. Explains how meter works, stresses accuracy and simplicity, also describes a new damping device to reduce galvanometer fluctuations. Lists grains, other products on which meter can be used to determine moisture content. Tagliabue Instruments Div., Weston Electrical Instrument Corp.

105 SO_2 Analyzer-Recorder — Eight-pp Folder ND46-81 presents company's Thomas Autometer for automatic analysis and recording of air pollution by sulfur dioxide now available as either an integrating or non-integrating assembly with Speedomax electronic recorder. Principle of operation and application of instrument is explained, illustrated. Schematic drawings show flow systems of both integrating type (which charts data in detail) and the non-integrating type providing a simplified record. Leeds & Northrup Co.

106 Oxygen Recorder—Bulletin 51-820, 16 pp, explains and illustrates operation of manufacturer's oxygen recorder. A large application table shows where, how and why the instrument is used, and three-color illustrations show how an analysis is made. Both analyzing and recording sections are described, also gas sampling systems used with instrument. Includes chart-illustrated discussions of results obtained with it in several installations. The Hays Corp.

107 Gas Dust Instrument—Now available are engineering data sheets on a gas dust analyzer, recorder and alarm, an instrument designed to record the amount of total suspended solids or dust particles in gas streams. Suggested applications for the instrument include blast furnace gas lines, boiler smoke stacks, process stacks. Typical charts and sampling arrangement illustrated. In looseleaf binder. General Power Plant Corp.

108 Wide Range Regulator—Featured in Bulletin 316 is an expansion steam type temperature regulator operated by water or compressed air. Explains how regulator works, how it is easily changed from direct-acting to reverse-acting instrument. Typical applications and available accessories pictured. The Powers Regulator Co.

109 Imported Tachometer — Illustrated Bulletin 35-68 covers a multi-range, centrifugal type hand tachometer manufactured in Germany and now being distributed in this country after being unavailable for several years. Gives features and operating details, price information. James G. Biddle Co.

110 Precision Gage Guide—A 50-pp ordering guide for manufacturer's line of thread and plain gages, Catalog 51 is well illustrated with photos and contains full information on sizes and prices as well as pertinent application suggestions. Includes a helpful section of tables and charts giving screw thread product limits, tolerances, basic dimensions, explaining measuring methods and illustrating standard thread gage forms. Republic Gage Co.

PUMPS

111 Centrifugal Sump Pumps—Eight-pp Bulletin WQ-220 covers manufacturer's Type VS and VN sump pumps, available in wet or dry pit types for handling clear liquids, sewage and other liquids containing solids, and made in 1½ to 6 in. sizes, capacities to 2000 gpm and heads to 120 ft. Besides helpful application suggestions, provides external and sectional views, impeller designs, dimensions, selection tables. Warren Steam Pump Co., Inc.

112 Rotary Pumps—Eight-pp Bulletin WQ-50 describes in detail an improved rotary pump for discharge pressures to 250 psi with capacities to 1000 gpm depending on liquid handled and pumping conditions. Sectional and exterior views of pump included, also dimensions, specifications and selection chart. Economy, versatility, quiet operation stressed. Warren Steam Pump Co., Inc.

113 Chemical Service Pump—A medium-duty pump for process and chemical plants having semi-critical requirements, available in 1 to 3 in. discharge sizes and heads to 240 ft, is covered in Bulletin WQ-213. Includes specifications, dimensions and selection chart, also external and sectional views. Warren Steam Pump Co., Inc.

114 Big Pumps — Illustrated Bulletin W-313-B1B is on manufacturer's Mixflo pumps for irrigation, drainage, sewage, disposal, condenser circulating and low head water supply, and offering capacities from 2000 to 225,000 gpm at heads to 30 ft. Includes line drawings and dimensions of both vertical and horizontal types. Worthington Pump and Machinery Corp.

MAINTENANCE AND CONSTRUCTION

116 Quick Cure for Sick Floors—Bulletin 200 is an 8-pp instructive booklet offering information on how and where to apply Plastic Hook flooring as well as technical data about the product itself. Typical flooring applications for this heavy-duty surfacing material are illustrated to show how new life can be given to old floors. Stresses use of Plastic Hook for resurfacing areas subject to heavy traffic. United Laboratories, Inc.

117 Facts About Floor Safety—How to make floors as safe as possible is the subject of this 36-pp booklet. Three factors are cited as providing safer floors: proper initial finishing, correct methods of routine maintenance and use of right products. Details recommended finishing techniques and routine maintenance methods for asphalt and rubber tile, linoleum, wood, concrete and terrazo flooring. Lists danger points in maintaining various types of floors and gives practical floor care hints about cleaning, polishing, refinishing. S. C. Johnson & Son, Inc.

118 For Floors That Take Beatings—Twelve-pp illustrated booklet, "Why Engineer an Industrial Floor" points out why installation of industrial floors for maximum life and minimum cost is a task requiring experienced planning, skilled execution and exacting cost control. Describes how floors can be engineered to withstand moving and deadweight loads, shock and vibration, extreme temperatures, oils, greases, chemicals and industrial wastes, etc. Includes survey check sheet for individual plant floor conditions. Flash-Stone Co., Inc.

119 Economy of Good Paint—Technical Bulletin Sheet 625 explains briefly six reasons for long-run economy of company's aluminum paint. Tells how it's packaged, gives prices. Prufcoat Laboratories, Inc.

120 Care of "Mixture" Brushes—Although featuring company's own Bak-O-Blend line this little folder is filled with helpful tips on how to get the best and most service out of all bristle-and-horsehair brushes now prescribed by defense regulations. Tells how to condition brushes, use them, comb, clean and store them. Directions cover their use in oil-base, shellac and casein-type paints. Baker Brush Co., Inc.

September, 1951

Card void after 6 months.

PLANT ENGINEERING

Please have manufacturers send without obligation information or bulletins indicated by following numbers.

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Company Address .....

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(If you prefer delivery at your home also fill below)

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Also, use this card for more information on advertised products.

121 Stretching Maintenance Dollars—Vol. 5 No. 9 of Metco News tells how metallising can stretch maintenance and operating supplies dollars under NPA Regulation No. 4. Tells how a refinery metallizes worn machine parts, and how another user salvages damaged pistons from diesel locomotive engines at a fraction of their replacement cost. Metallising Engineering Co., Inc.

122 On Replacing Window Sash—The role of glass block, especially as a replacement for worn-out window sash during material shortages is outlined in this 16-pp booklet, which pictures several industrial plants where glass block has solved problems of moisture, cold, glare and maintenance. Architectural details and installation data are provided, and the replacement of worn-out windows with glass block panels is shown in step-by-step photos. Dimension tables and technical data on correct method of installing glass block in various types of walls included. American Structural Products Co.

123 Construction Manual—Besides being a comprehensive and fully illustrated ordering book, 78-pp Catalog 700 serves as a simple easy-to-use manual on how to frame, hang, mount and support many kinds of mechanical and electrical equipment with company's all-purpose metal framing. Its filled with clear pictures and detailed data on product and applications. Unistrut Products Co.

ELECTRICAL

124 Packaged Electric Power—Bulletin GEA-5600, 24 pp, outlines methods of obtaining electric power equipment for quick expansion at low cost and with a minimum of critical materials. Tells how use of "packaged" electrical systems simplifies plant engineering problems, cuts equipment and installation costs, insures quicker delivery of electrical equipment. Illustrated with 52 photos and diagrams, booklet shows how "packaged" units, comprised of standardized components, eliminate need for individually-engineered assembly of piecemeal components. Also lists 31 other publications giving information on available equipment for industrial power expansion. General Electric Co.

125 Switches in Brief—Divided into sections each covering a different switch classification, Condensed Bulletin 54 covers entire scope of company's 5000 snap-action switches. Catalogs, describes and illustrates representative models in each classification. Presents heavy duty limit, medium duty limit, explosion-proof, high capacity enclosed, die-cast enclosed, basic, V3 switches and actuators. Shows at a glance the many uses to which company engineers have applied the basic precision snap-action switching principle. Micro Switch.

126 For Efficient Charging—Illustrated Bulletin B-11-210 covers motor generator battery charging equipment designed to protect battery performance, prolong battery life and minimize maintenance. Stresses automatic operation of the charger, describes features and includes section chart on units for both lead-acid and Edison type batteries. The Electric Products Co.

127 Battery Technology Handbook — This is a 56-pp revised edition of company's manual of technical instruction and engineering data on the care of motive power storage batteries. Major addition is a section on charging, which includes information on modified constant voltage and two-rate charging, boost, equalizing and emerging charging, control of discharge etc. Other sections cover the theory of the lead-acid battery; practical tips on care and operation; maintenance and repair; technical data. Fully illustrated with photos, line drawings and charts. Also catalogs battery parts, tells how to order them. Gould-National Batteries, Inc.

128 Single Phase Inductrols—Publication GEC-795 describes of company's single-phase low-voltage dry-type induction voltage regulators, explaining advantages of the redesigned inductrol equipment, its application and operation. Also contains sketches, line drawings and charts showing operating connections. Price and purchasing data on the new line, rated at 0.3 to 24 kva is included. General Electric Co.

129 Circuit Breaker Panelboards—Twenty-pp Booklet B-5200 describes circuit breaker panelboards for the control and protection of lighting, appliances, other power applications and the circuits that supply them. Presents company's line of De-Ion circuit breakers for industrial and commercial requirements, in capacities from 10 to 600 amp. Westinghouse Electric Corp.

130 Easier Connectors — Catalog 49B provides 8 pp of illustrated data on the Bitherend electrical connector. Explains how two of them in the same size can be used to make a quick, positive connection. Gives dimensional, price and general rating information, plus a summary of new applications for this connector, originally developed for use as a shipyard welding cable connector. Albert & J. M. Anderson Mfg. Co.

131 Solenoid Contactors—Bulletin 4458 describes company's size O solenoid-type multi-pole contactors for load and control use in controllers for machine tools, refrigeration and air conditioning equipment. Discusses construction details, gives application information, ratings, dimensions. Ward Leonard Electric Co.

132 How Tubes are Tested—Form TTC, 16 pp, illustrating and explaining different operating theories and the four basic methods of tube testing, includes circuit diagrams and formulas. Also contains a summary of a survey on the nature of tube failures. Several models of manufacturer's dynamic mutual conductance tube testers are described, pictured. The Hickok Electrical Instrument Co.

LIGHTING

133 Proud of Your Lighting?—Details of the 1952 Merit Award Competition for outstanding lighting installations sponsored by the Fourth International Lighting Exposition and Conference are given in the official rule booklet just released. This competition affords an opportunity to receive the lighting industry's highest recognition. Tells who's eligible, gives rules of entry, describes awards. Ask for booklet now, closing date is January 31, 1952. Industrial and Commercial Lighting Equipment Section, National Electrical Manufacturers Assn.

134 Light for Safety and Security—How good outdoor lighting can prevent theft and sabotage, insure safe handling, reduce guards needed, provide greater safety for night shift workers and help solve their parking lot traffic problems, is told in Bulletin B-4791, 24 pp. An excellent presentation of complete plans, equipment recommendations and suggestions on applications and mounting methods, includes helpful discussion of power distribution and control systems. Covers lighting for various types of boundaries, piers and docks, plant entrances, industrial thoroughfares, storage yards and vital structures. Westinghouse Electric Corp.

MATERIALS HANDLING

136 Feeders, Conveyors — An excellent presentation of electric vibrating feeders and conveyors is given in 90-pp Catalog 830 covering manufacturer's line of equipment for handling a wide variety of wet and dry materials and including large and small capacity units, for temperatures of -30 to 2000 F. Explains principles of design and operations, gives tips on installation, discusses controls. Includes photos, dimensions and specifications for models listed. Also provides many installation photos and information useful in planning for installations including a table showing densities of typical solid materials. The Jeffrey Mfg. Co.

137 For Coal and Bulk Materials—Twelve-pp illustrated Form 513 describes a complete line of flight and belt type portable conveyors and under car unloaders for handling coal, coke, sand, gravel and other bulk materials. Brief specifications are provided for both electric and gasoline powered models and on hand-move and self-propelled conveyors. Lake Shore Engineering Co.

138 For Big Handling Jobs—Catalog 400-R-3, 20 pp, features manufacturer's revolving cranes in industrial use, providing views of the huge cranes at ports and plants throughout the world. Specialized applications are also shown. Includes short job stories as well as rated lifting capacities of five standard models. American Hoist & Derrick Co.

139 Pneumatic Tired Trucks—Operating data and specifications on two new pneumatic-tired fork lift trucks are provided in illustrated Bulletin 1550. Trucks featured have capacity of 2000 lb at 15- and 24-in. load centers. The Buda Co.

140 What's New in Grab Buckets—Bulletins C-1, R-1 and RD-1 are on various types of grab buckets for handling coal, ore and other bulk materials. Those described include a bucket designed to work on the ends of operating lines of man trolley ore and coal bridge tower installations; one designed to work in the "bight of line" for fleet-through operation on rope system bridges and towers; one designed for steeple type towers. Special features outlined; specifications, photos of models and installations included. Mead-Morrison Div., McKiernan-Terry Corp.

(Continued on page 117)

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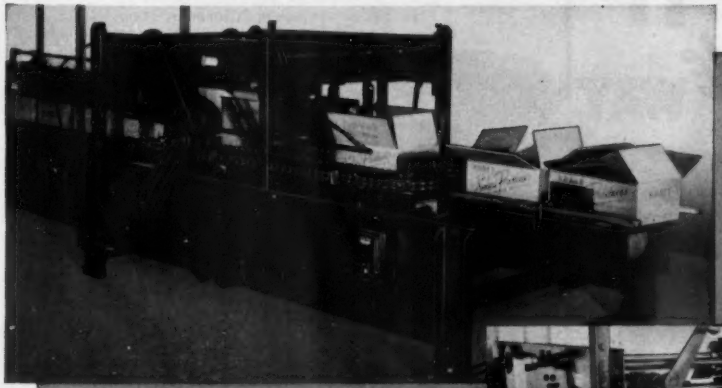
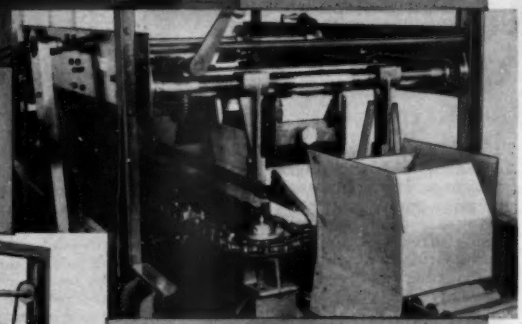
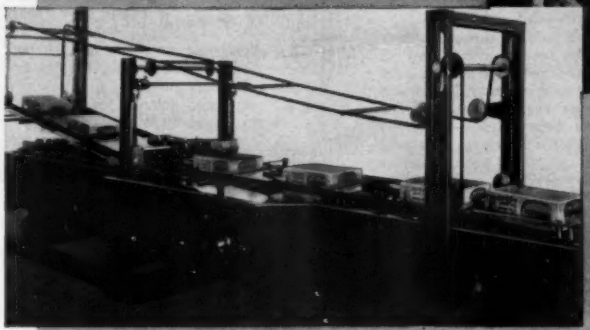


Automatic Top and Bottom Case Sealer made by A-B-C Packaging Machine Corp., Quincy, Ill. Main drive Diamond No. 434, No. 66 on sealing operation and 1½"P extended pitch chain for conveying the cartons through glver section.



A-B-C Semi-Automatic Top and Bottom Case Sealer with Diamond No. 434 on main drive, No. 66 on closing mechanism and 2"P roller conveyor chain for conveying cartons through glver section.

Diamond No. 434 roller chain for main drive and No. 66 with cross flight attachments for conveying on A-B-C Case Unloader and Unscrambler.



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● For the packaging of products of all kinds for civilian or military use, modern automatic machinery is necessary because it multiplies the speed and requires a minimum of manual labor.

Driven by dependable Diamond Roller Chains, the A-B-C Case Sealers and Unloaders operate at high speed and low cost. Efficient steady operation is assured with minimum labor or attention.

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PUMP IT THIS Simple WAY

PROGRESSING-CAVITY ACTION DOES THE "IMPOSSIBLE"

What Can It Do For You!

- NO PISTONS
- NO VALVES
- NO HIGH-SPEED IMPELLERS

Pumping problems? You can *end them* with amazing R & M Moynos. If your materials are tough-to-pump, or if *other pumps* won't take them, learn what thousands already know . . . Moynos move virtually anything that will push through a pipe—and Moynos *stand up!*

BUILT FOR YOU . . . Don't think of Moynos as *all-purpose* pumps. They aren't! Each is intended to do *one job* faithfully and well. A Moyno for potato salad, for example, merely *looks* like other Moynos that handle slurry, plaster, tooth paste, hamburger, brine, liquefied gases, cake-mix, or water—to name just a few of the *many* Moyno uses. No part of the pump has a fixed specification. This depends entirely on materials handled and the service.

In *basic principle,* all Moynos are identical. They have no bearings in the pumping compartment—self-prime with nearly perfect suction vacuum—deliver *positive pressure* without pulsation—meter flow—reverse by reversing rotation . . . and all have only *one moving part*—a simple helical rotor. There are types for general service, and for foods and other fields—in sizes and lengths for all capacities and pressures to 1000 p.s.i. Moyno "*progressing-cavity*" pumping can save you both time and money.

NO OTHER PUMP LIKE THIS . . . Get the whole story on these astonishing pumps that handle chemicals, sharp abrasives—do *every kind* of job well. Write for Bulletin P-30-E.

R & M MOYNO® PROGRESSING-CAVITY PUMP

YOU NAME IT—THE MOYNO WILL PUMP IT!

A MULTI-STAGE MOYNO

Multi-stage Moynos for higher pressures merely have longer rotor-stator pumping elements. The Moyno is that simple!

ROBBINS & MYERS • INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

MOTORS • HOISTS • CRANES • FANS • MOYNO PUMPS

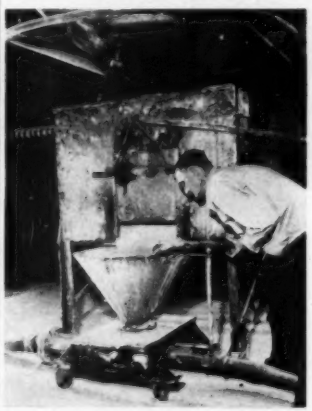
(Continued from page 32)

Failure to properly dry out the windings of motors after prolonged idle periods was the cause of numerous failures, particularly in seasonally operated plants. In damp climates, moisture absorption during idle periods can largely be prevented by maintaining the machine temperatures above the condensation point. Electric space heaters will frequently prove quite suitable for this purpose. The heaters should be located preferably under the motors, and placed so as to allow for even distribution of heat along the entire length of the machine. Precautions against the possibility of fire should be observed when drying motors in this manner.

Considerable savings can be realized by checking the surroundings of all motors for adverse moisture conditions of the more common types that have been described and seeing that necessary corrections are made. *From an article by H. M. Marsden, in Westinghouse Maintenance News, a publication of Westinghouse Electric Corp., East Pittsburgh, Pa.*

Eductor Improves Handling of Spent Clay

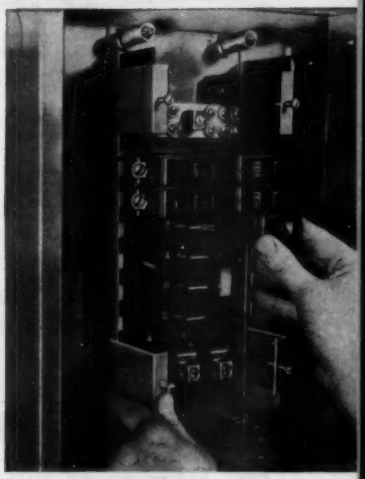
ENGINEERS AT THE Marcus Hook, Pa., refinery of Sun Oil Co. have improved the method of moving spent clay to a settling basin. This is accomplished by the use of a hop-



Clay pours from secondary hopper into eductor hopper. Water washes clay down into eductor chamber and then through flexible hose to settling basin

per type eductor which is mounted on a movable platform, with the hopper located above and the eductor below the platform.

When it is necessary to remove spent clay from any one of the ten filter shells, a movable secondary drum, or hopper, is rolled under the man-head of the filter shell to receive the spent clay. A gate in the



QUICK-MAKE, QUICK-BREAK PLUG-IN BREAKER—Trumbull's new NLTQ Panelboard introduces the first *plug-in* circuit breaker with quick-make, quick-break operation. Other features: both *thermal* and *magnetic* protection . . . trip-free . . . pressure-type silver-plated copper plug-in contacts . . . all ratings physically interchangeable. Adjacent breakers are on alternate phases—assuring balanced loads and circuits.

New insulating material

KEEPS PANELBOARDS COOLER

The base of this panelboard interior is made of *Plastisol* . . . the first time this amazing plastic material has been used for this purpose.

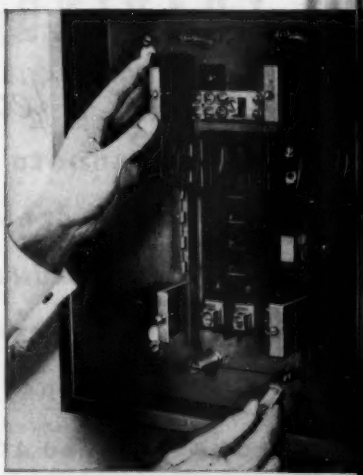
Here are some of the properties which make Trumbull's new NLTQ Panelboard a superior product which will give you excellent service.

Plastisol has very high thermal conductivity and is an excellent radiator of heat. Copper bus bars encased in Plastisol run 10% cooler than in open air!

SUPERIOR TO ALL OTHER TYPES OF INSULATION

Other Plastisol advantages making it superior to all other types of insulation for this purpose include its ability to resist acid and alkali, high temperatures (not harmed at 212 F), tracking and carbonizing. It will not shrink or become brittle, even at minus 30 F.

Trumbull's Plastisol base is Underwriters' Laboratories, Inc. approved and endorsed by the Electrical Council.



QUICK INSTALLATION—NO NUTS AND WASHERS—Interior is mounted in box by compression springs . . . which permit easy release for removal. Springs also permit lining up fronts regardless of uneven box installation. Trumbull NLTQ panelboards with lug or circuit breaker mains come in capacities up to 225 amperes in a range of 4 to 42 circuits. Write for Bulletin TEB-14.

TRUMBULL (T) ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY
PLAINVILLE, CONN.

BARCOL OVERdoors

for

LOADING PLATFORMS

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RUGGED CONSTRUCTION

ROLLER CRANK CLOSING ACTION

TAILORED COUNTERBALANCING SPRINGS

WEATHERTIGHT

EASY OPERATION

LONG LIFE and LOW MAINTENANCE COSTS

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SALES AND SERVICE REPRESENTATIVES IN PRINCIPAL CITIES

secondary hopper is regulated to permit the proper amount of clay to feed into the eductor hopper.

Water, by-passed from the inlet line on the eductor, issues through the wash down nozzles in the eductor hopper. This water washes the clay down into the eductor chamber. Then the water, which issues through the nozzle of the eductor, entrains the clay and discharges through the flexible hose with sufficient force to carry slurry to settling basin. *From a news release for Schutte and Koerting Co., Bucks County, Pa.*

Three Tampers in One

A CUSTOM MADE backfill tamper, engineered to permit operation of three tampers simultaneously, is reducing time and labor costs about 50 per cent on the construction job at Travis Air Base, Fairfield, Calif.

The three tampers are mounted in a frame, which also carries an air line oiler and manifold which feeds all three machines from a single air hose. Equipped with dual handles, the unit is operated by a two-man crew. It is reported that 10 per cent greater compaction is obtained with this triplex tamper. *From Thor Scoreboard, a publication of Independent Pneumatic Tool Co., Aurora, Illinois.*

Triplex tamper used for compacting trench fill-in speeds construction work

Elevators Service Steam Line

ELEVATORS, LOCATED at opposite ends of a 1300 ft tunnel between a new boiler room and an existing turbine room, transport men and materials 75 ft and 90 ft below basement levels many times daily. The idea for this tunnel is part of an over-all plan to expand the power-generating capacity of the Corn Products Refining Co. plant at Argo, Illinois, from 12,000 to 22,500 kw.

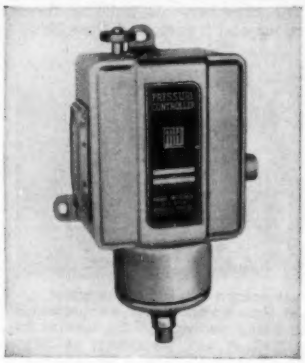
The new boiler room is located at the far northern edge of their property so that smoke from the coal-fired boilers will not bother the food-processing plant and also to permit further expansion. As a result, a straight-line tunnel was constructed below existing facilities.

C. E. CARROLL, of Abbott Laboratories, SUBMITS CONTEST WINNING IDEA

The problem of synchronizing the flow of steam to a drying drum with the flow of slurry onto the drum was very neatly solved by Mr. C. E. Carroll of Abbott Laboratories of North Chicago, Illinois. Formerly, variations in slurry feed and steam pressure to the drying roll caused the product to come off the roll too wet from time to time.

Mr. Carroll, who won a Honeywell electric clock thermostat for telling about the application, used two PO97A Honeywell Pressure Controllers and two air operated control valves, one using air-to-open, and the other using air-to-close.

The system has been set up so that when steam pressure drops in the main line to the dryer one pressure controller opens the air-to-open valve to admit more steam. The air line that opens the steam valve has a branch that feeds into a second controller, causing it to increase the air pressure to the air-to-close valve in the slurry feed line, cutting down the flow of slurry.

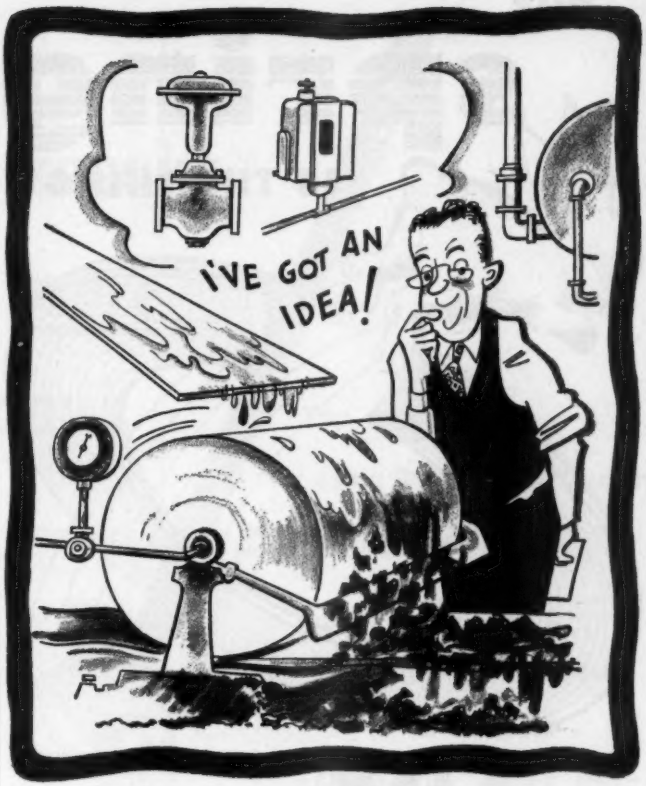


Honeywell Pressure Controller

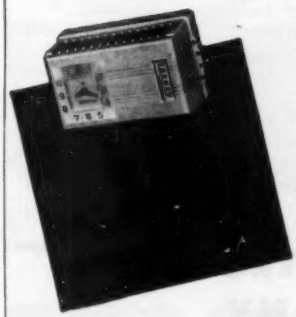
The result is an accelerated response to the steam pressure drop: the steam to the dryer increases, and the flow of slurry decreases simultaneously, so a uniformly dry product comes off the drying drum.

NEWSPAPER FOR PLANT ENGINEERS ANNOUNCED

Honeywell's Industrial Division now has a periodic publication—Industrial Control News—which contains detailed information on many new and unusual applications for automatic controls throughout industry. In its pages, production and maintenance men tell how they are reducing costs and increasing operating efficiency on all types of equipment. According to a recent release from the company, anyone interested in industrial controls can contribute to *Industrial Control News* . . . and can receive copies . . . by sending name, company, title and address to MINNEAPOLIS-HONEYWELL REGULATOR CO., Station 70, 4491 Wayne Ave., Philadelphia 44, Pa.



do you have an [redacted] for the HONEYWELL INDUSTRIAL CONTROL IDEA DERBY?



Just send us a sketch and description of how a non-indicating control is now being used to help keep things running smoothly in your plant. Think about it! Then send it in! An impartial board of judges will rate it in terms of its importance to the maintenance of plant operations. You may win a Honeywell Electric Clock Thermostat!

All material submitted becomes the property of MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4491 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

Brown Instruments

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IS THE THING!

KNIFE-EDGES *BITE* INTO FLANGE SURFACES

AJAX
SPIRAL WOUND GASKETS

The gaskets with more "bounce to the ounce" of bolt load. Built-in resilience for positive permanent seals.

Made for all types of pipe flanges, pressure vessels, boiler manholes, handholes, tube caps, water walls, economizers and other boiler accessories. Ask your supply house. AJAX gaskets, are universally available through Industrial Distributors.

HEAT EXCHANGER GASKETS

Double jacketed metal-asbestos, precision made to specifications in any desired size, shape or metal. Estimates furnished on receipt of details. Write

PRESSURE-SEALED

THEY BREATHE WITH VARYING PRESSURES AND TEMPERATURES

LIGHTER BOLT LOADS, SAFER SEALS

NO DRIP—NO SQUIRT—NO HISS

UGS UNITED STATES GASKET COMPANY

648 N. 10th Street Camden 1, N. J.

Leading Fabricators of "TEFLON" for the Chemical, Process and Electronic Industries.

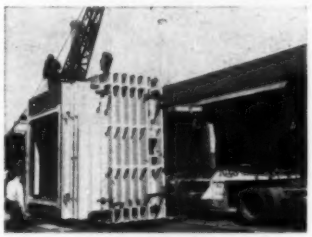
Frequent inspection and repair operation are necessary on this pipe line because daily temperature changes from 50 to 750 deg cause a 54 in. expansion in the line. Because of this the automatic passenger elevators were installed at each end of the tunnel to provide for the vertical transportation of personnel, tools and materials from upper levels to the underground steam pipe. *From a news release for Otis Elevator Co., New York.*

Plant Engineering Section Helps Install Testing Chamber

THE HOT, DRY Sahara. Frigid wastes of Siberia. Steamy jungles of the South Pacific. These climates, or the climate of any place on the face of the earth, can be simulated in a stratosphere chamber recently installed at Radio Corp. of America. With this chamber, equipment can be tested under any conditions of altitude, temperature or humidity.

Installation of the chamber presented a variety of problems to the Plant Engineering Section.

The chamber was built in three sections and transported from New-



Front section of chamber is pulled upright from trailer bed by derrick which will swing section through opening in the wall of test laboratory, at right

ark, N. J., in the early hours of the morning. It was necessary to obtain special clearances from the highway department because the chamber overhung the trailer 3 ft on each side and created a traffic hazard. These sections weigh 21, 17, and 11 tons. For safety in shipment, the units were welded to the trailer bed, then cut free by acetylene torches when delivered.

In order to move the sections of the chamber into the building, an area of wall 20 ft by 18 ft had to be removed. The first step of assembling was to bolt and seal the sections and then level the entire unit. The door of the chamber weighs approximately 2 tons and is moved into position on rollers from above. In order for the door to seal perfectly, an air cylinder is installed on each corner to exert the required pressure. *From an article by E. S. Firth and J. B. Davis, in RCA Victor Family News, a publication of RCA Victor Div., Radio Corp. of America, Camden, N. J.*

piping repairs *cost more* today!

Crane No. 7
150-Pound Brass Globe Valve
with composition disc

You spend less
by using Dependable Quality

CRANE VALVES

...That's why more Crane Valves are used than any other make

Disc repairs made in a minute

You save maintenance time and money when you use Crane No. 7 Brass Valves with composition disc. When a leak shows up, you don't change valves... just open the bonnet joint and slip on a spare disc holder with a new disc already in it.

And by changing the type of disc, you can adapt No. 7 valves to a wide range of services—steam, hot water, cold water, air, oil, gas, and gasoline. Made in globes and angles; screwed or flanged ends.

Simplified maintenance and complete adaptability to your service typify Crane Quality valves and fittings for every need. That's why they cost less in the long run.

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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

MAINTENANCE & OPERATION

of buildings, utilities and facilities

Starting a Nut

The job of starting a nut in a location difficult to reach with the fingers may be made easier by twisting a piece of wire around the nut. This will serve as a holder until the threads engage

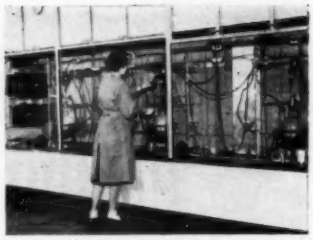
Instruments Help Solve Paint Company's Test Problems

Contributed by Tagliabue Instruments Div.

THE PROBLEM OF automatically controlling four quantitative tests simultaneously in the pilot plant of Socony Paint Products Co. of Metuchen, N. J., was accomplished by switching from manual control to control by instrumentation.

In the manually controlled tests, conducted for the purpose of developing improved products, four miniature stills were filled with varying quantities of alkyd resins, phthalic anhydride, glycerine, vegetable oils, and other materials, heated by line current and put through a reflux system according to a definite program. Control of the heat was done manually by hand regulation of four individual variacs, one for each still. To determine the temperature, four individual readings were required. To increase the temperature, each variac had to be handled manually.

The switch from manual to automatic control was accomplished by using our instruments. The instruments used were only one controller, a four point potentiometer with thermocouples placed in each still, and one program unit. As a result the entire operation can be controlled automatically after the program is set up with only these two instruments. The only manual labor involved is adding various solvents.

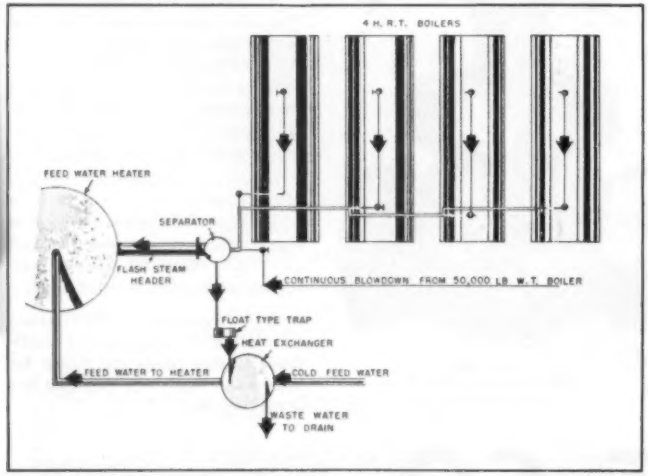


The two instruments at left automatically control the simultaneous heating of the four stills in Socony's pilot plant

In operation, the instruments can eliminate the possibility of errors in any one test causing undesirable delays in the quantitative results. If one unit breaks, results from the other three will be conclusive and the entire test will not have to be repeated.

Continuous Boiler Blowdown Saves Dollars in This Plant

Contributed by G. F. Suchy, Waukesha, Wis.



This sketch indicates a system of heat reclamation which the author arranged at his plant. A system similar to this should prove valuable in any plant where steam is used for processing and a large amount of make-up water is required. Using this arrangement under conditions prevailing at this plant the author points out that feed water temperature showed consistent gain of from 10 to 12 F

Porcelain Enamel Now Bends

PORCELAIN ENAMEL that bends has eased storage problems and simplified production for a Midwest stove manufacturer, according to the Porcelain Enamel Institute.

The process, in this case, is applied to the production of oven liners. It enables an automatic spray application and complete firing of porcelain enamel prior to forming and bending, replacing the former dipping method of application which could not be performed until after the liners were formed and welded.

Key to the production method is a comparatively thin coating, approximately 0.003 in. thick. Panels for the liners, 24 gauge steel, are placed on a cable conveyor, and are coated on one side by an automatic spray. A light reinforcing coating then is applied by hand sprayers to the ends of the panels, which will become the liners' sides.

Tremendous savings in dryer and furnace chain space are realized by coating, drying and firing the side, top and back panels as separate flat pieces. The flat, unformed enameled pieces then can be stored, until needed at the assembly line.

Conveyors Help Fill Mail Orders

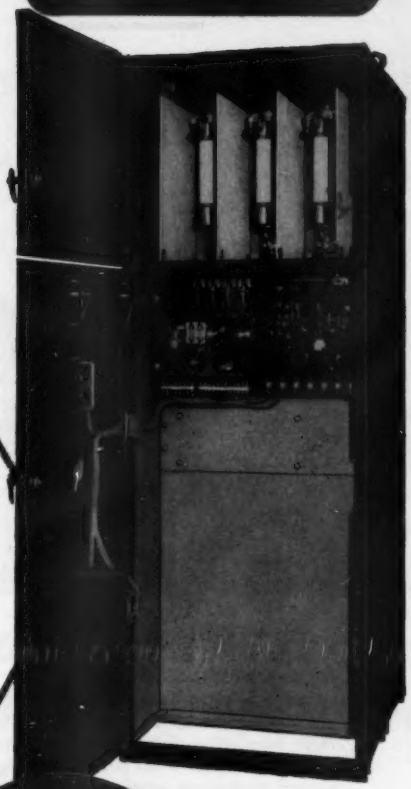
THE MAIL ORDER operation at William Filene Sons Co., of Boston, is planned to handle a large volume of catalog business with a minimum of confusion and delay. This is accomplished by using conveyors to speed up the job of filling mail orders. The following system has been arranged to keep the complete operation working smoothly.

All customer orders are typed onto a salescheck form in a central typing office. The salescheck are sent to a control desk where they are scanned by a clerk. The merchandise bins (A) are divided into five major sections, each one being

Complete Control and Protection for Your Motors

Type H Starters

ONE ATTRACTIVE easy-to-install steel cabinet is all you need between line and motor when you specify Allis-Chalmers Type H Starters. Contactors, protective devices, meters, relays . . . everything you need for complete control and protection of your motors is built into Type H Starters. You get:



1 **Short Circuit Protection . . . provided by current limiting fuses that are easily accessible.**

2 **Overload Protection . . . Thermal relays have compensating elements — automatically adjust for ambient temperatures — trip on motor overload only.**

3 **Safe, Accessible Cubicle . . . upper front compartment encloses disconnect type fuses; lower front compartment, the low voltage control devices; rear compartment, the high voltage equipment.**

4 **Easy Installation . . . single steel enclosure is easy to handle, internal wiring is complete, wiring terminals accessible, easy to connect.**

5 **Personnel Protection . . . high voltage fuse compartment has electrical interlock.**

6 **Meters, Push Buttons, Recording Instruments, Rheostats, and similar devices you may need are mounted on the door of the low voltage compartment.**

Other features include undervoltage protection . . . and your choice of either air break or oil immersed contactors — whichever is best for your application.

For motor control that is engineered to your job, specify Allis-Chalmers Type H Starters for motors with ratings up to 2500 hp. Call your nearby A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin for bulletin 14B6410A.

Specify Type 256 Air Break Contactor, shown, for tough, repetitive duty, longer contact life . . . Type MO Oil Immersed Contactor for normal starting duty or for service in dust laden, corrosive or very moist atmospheres.

A-3390

ALLIS-CHALMERS

3 men
+ 3 "j" hoists

multiply production many times

Here's proof that small companies as well as large can increase productivity per man with R & M hoists. Finger Lakes Chemical Co., Inc., Etna, N. Y. has repeat-ordered R & M "J" hoists again and again to permit vertical as well as lateral materials handling in the progressive expansion of plant operations to the upper floors and to the basement of their building. "Each time a hoist was installed," writes Mr. C. S. Benjamin, vice president, "we acquired a substantial increase in productive capacity *without increased labor*. In fact, the work became easier for the men. Today, as manufacturers of detergents . . . we receive and ship in carload and truckload quantities, with the entire operation being accomplished by a force of three men and one foreman."

With an R & M crane or hoist installation engineered to your job—more production per man or per foot of floor space may be easier to obtain than you think. Your nearest R & M field engineer will be glad to study your requirements without obligation. Write for Bulletin No. P91E.

TAKE IT UP WITH

ROBBINS & MYERS INC

MOTORS HOISTS CRANES FANS MOYNO PUMPS

HOIST AND CRANE DIVISION, SPRINGFIELD 99, OHIO

designated by a color. The control clerk scans the order and determines the sections which have merchandise on the order. He then takes a tote box and clips colored clothespins to its side, each pin corresponding in color to a section of the bins which has merchandise on the order. The order itself is placed in the tote box which is then pushed along the Load-Veyor running by the bins.

The order-filling clerk in the color-designated bins watches for clothespin on tote box which corresponds to her section color. She pulls the box off the conveyor onto

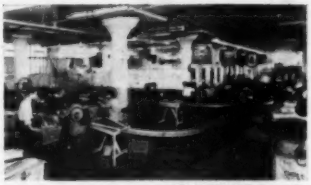


Photo: Market Forge Co.

Installation of conveyors in the mail order department at Filene's has resulted in faster turnover of mail orders

a table, fills the items called for in her section, removes the colored clothespin and pushes the box along the conveyor.

The filled order moves along to the inspection area (B) where it is checked for price and correct type of merchandise. It is then moved to the cashiering section (C) where the correct amount of the sale is rung up on a register. The cashiers push the boxes down inclined conveyors to the packing line (D) where they are taken off by the packers. After an order is packed, it is put into a rolling hamper truck and the full truck is moved into a storage area. Three or four times a day the hampers are unloaded onto a belt conveyor which carries them to the shipping room, dropping them onto a sorting belt. As they move along this belt, they are sorted into various routes for delivery.

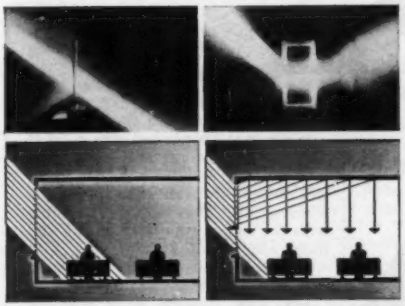
Air Compressor System Handles Heavy Load with Ease

THE AIR COMPRESSOR system installed by the Airport Engineering Department at Eastern Air lines, Miami Base, provides a steady, uniform pressure throughout the plant. Since nearly every department at the base requires compressed air, it is essential that this pressure be maintained.

The air compressor, supplying 18,000 cfm of air, is powered by a 300 hp synchronous motor. Instead of cutting out at 110 lb, it usually operates at a reduced rate. A 4 stage regulator cuts in on a 3 lb drop in pressure and the units start to work at one quarter capacity. Whenever demand builds up, such as in the operation of pressurizing

Technicians studying daylight illumination in the Test Room section of the Daylight Laboratory. Special light meters on desk tops read and automatically record illumination twenty-four hours a day throughout the year.

ONLY "DAYLIGHT" GOES TO SCHOOL HERE FOR Daylight Engineering STUDY



Direct sun causes uncomfortable brightness near windows, extreme contrast in other parts of room. Insulux Fenestration directs and spreads daylight to ceiling, keeps brightness at comfortable levels.

IN THIS SPECIAL one-room "schoolhouse," built by the Daylighting Laboratory of the Engineering Research Institute, University of Michigan, daylight is studied, tested, optical principles researched to learn how to get the highest *quality* light from daylight . . . to make it do a better lighting job.

To permit study of daylight in rooms of varying sizes and shapes, both ceiling and wall sections are movable. Ceiling sections may be lowered or tilted . . . wall sections are movable to permit variations in room size. Special light meters automatically record illumination.

One significant better-daylighting result is the development of Insulux Light Directing Glass Block No. 363. This new block controls light so efficiently that a building virtually "turns with the sun." Entire glass areas transmit free daylight from early morning to late afternoon.

A Daylight Engineer will be glad to show you the benefits the new Insulux Glass Block® can bring to your structures. Just write: Daylight Engineering Laboratory, Dept. PE9, Box 1035, Toledo 1, Ohio . . . Insulux Division, American Structural Products Company, Subsidiary of Owens-Illinois Glass Co.

INSULUX GLASS BLOCK

INSULUX FENESTRATION SYSTEMS

— by the leaders of Daylight Engineering

...Just to service lights?

PLANT ENGINEER: *%&$#*! We specified *hangers*... not hinges! We want to lower the lights, not the whole roof!

CONTRACTOR: Hangers? What kind of "hangers" bring lights down for servicing?

THOMPSON HANGERS! They lower lights to floor or ground level for safe, low-cost maintenance.

Well who climbs up to lower them? And what about fouled wiring and electrical hazards?

Listen! Full control is exercised from the floor. The fixtures are lowered by a chain or cable that's part of the installation, and the live contacts remain overhead.

Then how are they repositioned, and what holds 'em up?

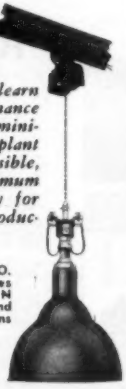
Repositioning is automatic because of the unit's design. Once raised, the light is held positively in place. It's safe and foolproof!

Sounds like a tricky operation. I'd like more details.

The whole operation can be accomplished in less time than it has taken me to tell you about it.

And you can get complete information from The Thompson Electric Co. Write for their new Catalog No. 50. You're in for a surprise, mister, on the hows and whys of efficient lighting fixture maintenance!

There's no obligation in requesting a Thompson Electric catalog. Why don't you write for one today, and learn how to cut maintenance costs to absolute minimum, make new plant safety records possible, and maintain maximum lighting efficiency for round-the-clock production operations?



CATALOG NO. 50 describes THOMPSON HANGERS and accessory items in detail.

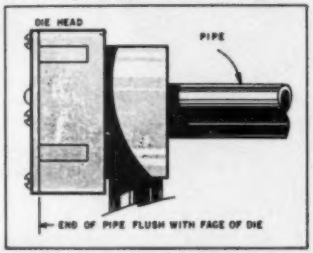
172 TE

THE THOMPSON ELECTRIC CO.

1165 Power Avenue • Cleveland 14, Ohio

a ship for equipment check or tests for leaks, the compressor cuts in by stages to meet the demand without lag. This same increased operation holds the pressure steady if use in a number of departments pushes the demand up suddenly.

For Proper Pipe Thread Length



A simple means of determining proper pipe thread length is to thread only until the end of the pipe comes flush with the face of the threading die

Gin-Pole Engineering

Contributed by H. B. McDermid

DURING THE REMODELING of a production process, the company decided to place an overhead trolley track tight up against the sixth floor ceiling to serve dip paint tanks that the process required. The track had to be 50 ft long and due to material shortages no regular trolley track was available. However, a 5 in. I-beam was available, and it was decided to use it in one 50 ft length.

Getting this 50 ft section of beam up to the 6th floor presented a problem. It could not be taken up the elevators or the shafts nor did the stairwells offer any better passageway. Fortunately the building was built on the side of a hill, so that one side was only 4 stories high to the location where the beam was to be placed.

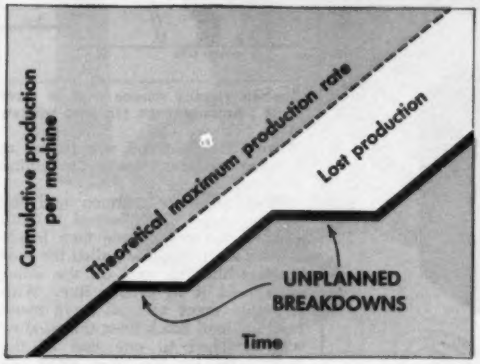
The only solution was to haul the 50 ft section through the sixth floor window. It was possible to stand the beam on end under the window, but with the most favorable hitch when the beam entered the window the end struck the ceiling, some 10 ft above the window, and left 40 ft of steel hanging out the opening.

What the job needed was a 50 ft giant to stand about 40 ft away from the building and lift up that outer end and gently slide it in across the window sill. This feat was possible with the aid of rope and blocks and three lengths of 2½ in. pipe with which the men set up a rigging scheme to move the beam.

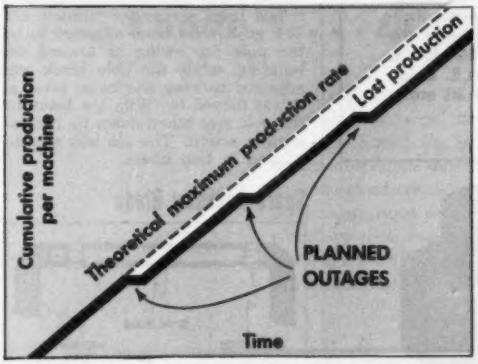
The pipe lengths were screwed tight together. Four guy lines were attached, three leading to stakes firmly driven, the fourth leading through the 6th story window. The pole was laid on the ground at right angles to the wall of the building, with its lower end (to be) about 30

Productive Maintenance!

A *Timely New* TOOL FOR MAINTENANCE MEN!



Unscheduled breakdowns continue to be a reality despite day-to-day routine maintenance efforts, resulting in production losses that can never be made up under today's round-the-clock operations in many plants. Without scheduled down-time, any maintenance program today is inadequate.



With the planned outage as its key, *Productive* Maintenance aims to narrow the gap between actual and theoretical maximum production on the part of a machine, particularly those essential to continued output. Planned outages consume far less time than unplanned breakdowns, thus increase actual production.

Here's a way to win more support from your management for today's vitally important maintenance job. With its new *Productive* Maintenance program, General Electric now offers you the means of emphasizing the positive part that maintenance can play in increasing output.

Production's working partner

Productive Maintenance is an approach to maintenance that regards it not as the step-child of production, but as its working partner. It anticipates and minimizes untimely production breakdowns by planned, conveniently-timed outages, to maintain the "like-new" efficiency of equipment at all times.

Helps increase output

You're familiar, of course, with its advantages—more production from each machine, more production from available manpower, more production from a smoother work flow, and the savings it permits. These advantages are being brought to your management's attention directly by General Electric through a series of advertisements and mailings.

Send for free "kit of tools"

In addition, we've prepared a complete "kit of tools" to enable you to present the facts *your* management needs to know before starting a *Productive* Maintenance program in your plant. Send for *your* free kit *now*—as a first step in helping both your company and yourself!

General Electric Company, Section A801-4
Schenectady 5, N. Y.

I'm all for it! Please send me a *Productive* Maintenance kit for use in our plant.

Name .....

Title .....

Company .....

Address .....

City ..... State .....

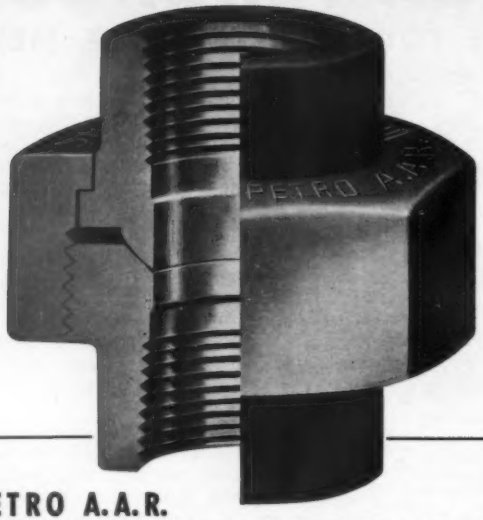
GENERAL ELECTRIC

Your Most Useful Servants

PETRO

REG. U.S. PAT. OFF.

FORGED STEEL UNIONS

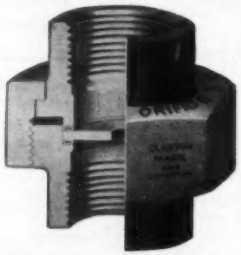


PETRO A.A.R. REG. U. S. PAT. OFF. **design unions conform to the inside dimensional specifications of Association of American Railroads standards. In standardizing on A.A.R. you have the assurance of interchangeability at all times. PETRO A.A.R. Unions will interchange part for part with any A.A.R. union malleable or forged steel. PETRO's basic design and its many other features make it a most useful union.**

C. M. & CO.

ORIFICE

Forged steel unions are recommended for flow control of steam, oil, ammonia, chemicals, water, gas, and air. Furnished with 18-8 stainless steel orifice plate and two steel-jacketed asbestos gaskets. Pressure to 3000 lbs., and temperatures to 900°.



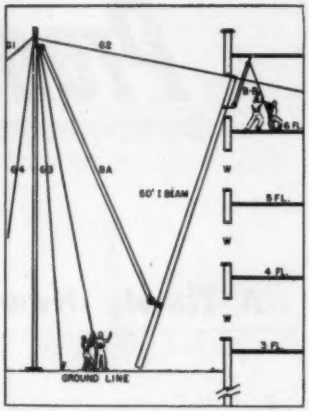
Write Dept. N for illustrated catalog or refer to listings in Composite Catalog pages 3140-3141, Refinery Catalog page 538, and Chemical Engineering Catalog pages 980-981.

ORDER BY TRADE NAME FROM YOUR LOCAL SUPPLY STORE

PIONEERS OF STEEL UNIONS SINCE 1912

CLAYTON MARK & COMPANY

1900 DEMPSTER STREET • EVANSTON, ILLINOIS



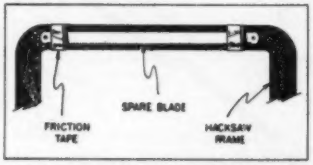
Gin-pole rigging scheme used to move 50 ft I-beam through 6th floor window

ft from it. This end was lashed to another stake, as close to the ground as possible.

With all guys manned and the hoisting rope block lashed to both ends of the pole, three men inside the 6th story window pulled the pole erect, while the men on the other guys held it in proper line. With the pole erect and all guys made fast, the load block from the window was attached to one end of the beam, and the gin pole block attached to the other end of the beam.

Hauling away on the window block (B-B) first brought one end of the beam to the window opening. Then the pole block (B-A) picked up the outer end of the beam until it laid level across the window sill. The guys were then adjusted to let the pole top swing in toward the building, while the pole block was adjusted to keep the beam level as it was moved in. With the beam in, the pole was taken down by reversing the action. The job was accomplished in two hours.

Spare Hacksaw Blade



Should a hacksaw blade break, time lost in procuring a new one will be negligible if spare is taped to frame

Inserts Used to Salvage Fuel Pump Castings

FUEL PUMP CASTINGS formerly scrapped because of worn and stripped threads are now salvaged at Sid Harvey, Inc., by the use of thread inserts.

In the repair operation, the dam-

Summa Cum Laude ... ***in the science of anti-friction***

Hundreds of SKF Distributor Salesmen who signed up for the "Refresher Course" on bearings passed with flying colors. Now—fully conversant with the latest developments in the field of anti-friction—they're better able than ever to help you get the best service out of original equipment and replacement bearings. Their advice is sound, their suggestions practical. They will be valuable to you in combining efficiency with economy, long life with low maintenance. Remember, when it's a question of bearings, call your SKF Distributor first. His men are specialists. They're worth more to you because they ***know*** more. 7210

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity
craftsmanship
metallurgy
tolerance control
surface finish
product uniformity
engineering service
field service

SKF
BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
—manufacturers of SKF *and* HESS-BRIGHT *bearings.*

Here's how Pangborn

Solves these Problems

with this modern equipment

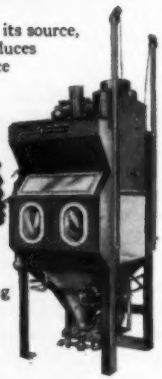
BLAST CLEANING!

Blast Cleaning Cabinet quickly and easily cleans rust, grime, dirt, paint, etc., from metal parts. Produces a clean, smooth surface on pieces up to 60" x 36". Models available from $315.00 and up.

Blast Cleaning Machine not only removes rust, dirt, scale, etc., but is ideal for maintenance and many other uses. Cleans large objects such as bridges, structural work, tanks before painting. Six sizes, portable or stationary, from $170.00 and up.

DUST COLLECTING!

Unit Dust Collector stops dust at its source, minimizes machine wear and tear, reduces housekeeping and general maintenance costs. Solves many grinding and polishing nuisances. Reduces material losses. Models from $286.00 and up.



PRECISION FINISHING!

Hydro-Finish Cabinet uses liquid blast, eliminating dust, and reduces costly hand polishing, cleaning and finishing of molds, dies, tools, etc. Removes scale, discoloration and directional grinding lines, prepares surfaces for plating and coating. Holds tolerances to .0001". Models from $1295.00 and up.

LOOK TO PANGBORN FOR THE LATEST DEVELOPMENTS IN BLAST CLEANING AND DUST CONTROL EQUIPMENT

Pangborn

MAIL COUPON for full details

(Check for more information)

- ☐ Blast Cleaning Cabinets
- ☐ Blast Cleaning Machines
- ☐ Unit Dust Collectors
- ☐ Hydro-Finish Cabinets

PANGBORN CORP., 3200 Pangborn Blvd., Hagerstown, Md.

Gentlemen: Please send me more information on the equipment I've checked at the left.

Name.....

Company.....

Address.....

City.....Zone.....State.....

Photo: Heli-Coil Corp.

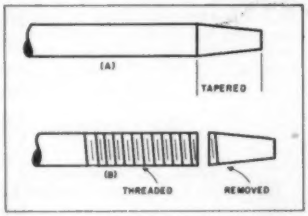
The thread insert is started into the new thread by hand and then rotated into final position by an inserting tool

aged thread is first cut out with a drill larger in diameter than the major diameter of the original thread. Then, the hole is rethreaded with a special oversize tap and the thread insert installed.

In the installation, the operator gives the insert a starting turn into the new thread by hand, and then positions the inserting tool for the final inserting operation. The insert is then screwed into the pump casting until it is a quarter to half a turn below the machined surface of the boss. Between 10 and 20 defective fuel unit castings are repaired by this method each week.

Forming New Threads

SOMETIMES A rethreading die must be employed to form new threads on a rod. The job can be accomplished by allowing an extra half inch rod length and grinding down this portion to form a long taper.



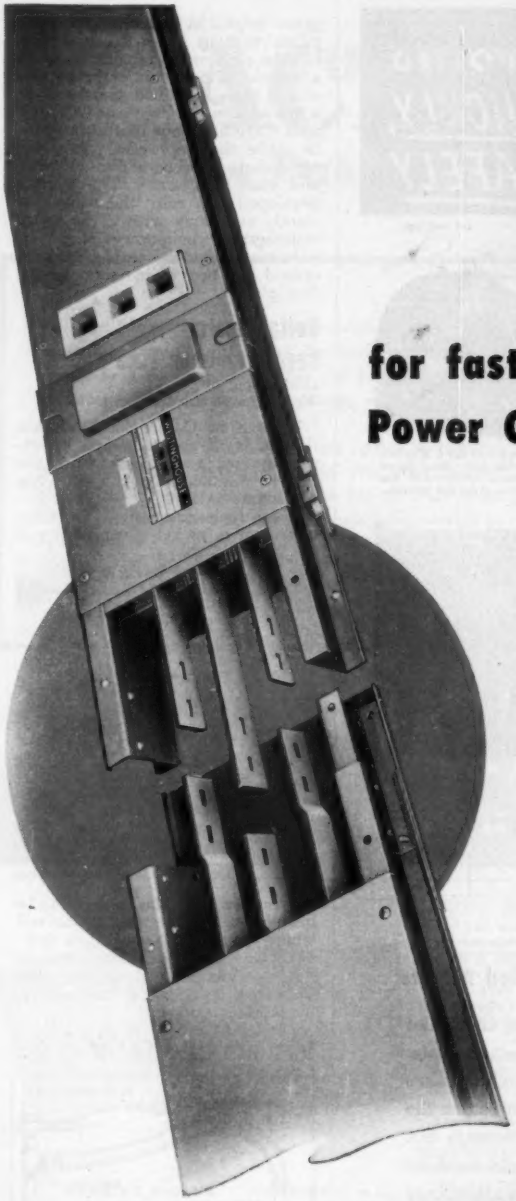
Tapered rod helpful for cutting threads

This will give sufficient clearance to permit the die to start cutting threads. After the threading is finished, this tapered extra length should be removed with a hacksaw.

Emergency Plug for Foot Valve

Contributed by Paul C. Ziemke

HAVE YOU EVER been confronted with a pump foot valve that was stuck open because of foreign matter that lodged under the flap? This usually causes the priming water to slip through and break the suction. The following suggestion may



BUS DUCT IS FLEXIBLE

for faster, lower cost Power Conversion or Expansion

Wasting time unraveling wire mazes? Wasting money "doubling up" on cable? Check these points of convenience provided in Westinghouse Bus Duct to speed power-line layout, simplify installation.

- Prefabricated sections, any length . . . convenient to handle, mount, and install with channel-type splice plates (illustrated).
- Plug-in receptacles every foot . . . eliminate long, secondary cable runs, facilitate rapid machine tie-ins, any time.
- To extend power-line runs . . . simply add sections of duct.
- To relocate duct . . . dismantle, rearrange, remount . . . no cable slicing or splicing; equipment fully salvageable; minimum outage time.
- Standardized ells, tees, crossovers . . . no problem with tight layouts, turns in any plane.
- Cantilever hangers . . . quickly aligned and bolted.
- Higher carrying capacity pound for pound than cable or conduit.
- 4 types of Westinghouse Bus Duct meet all load requirements, any service condition from transformer to machine.

Call your Westinghouse distributor for the full story, or write for Bus Duct Manual B-4272A, Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

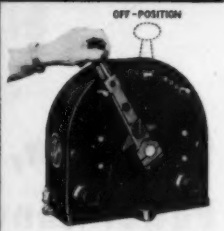
J-30057

DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH POWER LABORATORY

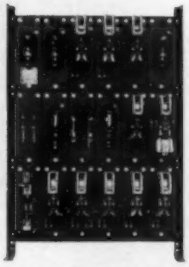
YOU CAN BE SURE... IF IT'S Westinghouse

BUS DUCT

HEAVY LOADS SPOTTED QUICKLY, SAFELY

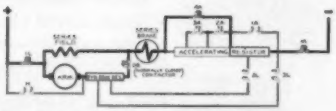


Speed-control Master Switches have short throw —narrow width—and are convenient for the operator to use.



The Wright Dynamic Lowering Circuit Controller (with protection) for crane-hoists.

First point lowering connections put all the current from the line through the brake for fast release.



Here's Where EC&M CONTROL Gives Unexcelled Results

The EC&M Wright Dynamic Lowering Circuit Controller for crane-hoists is well known for its ability to permit accurate, short movements when spotting a load. The operator has complete control of all lowering speed-points. In setting the cope with this 125-ton crane, quick response through fast brake release enables the operator to close the mold carefully —with a minimum number of movements which maintenance men recognize as a contributing factor to reduced up-keep. The Wright Circuit is safe —specify EC&M Crane Control.

WRITE FOR BULLETIN 921

Photo—Courtesy, Cleveland Crane & Engineering

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79th STREET • CLEVELAND 4, OHIO

prove helpful in correcting this condition without the need of lifting out the suction for repairs. Pour in a handful of peatmoss or loamy soil with a little ingrained grass root or a few handfuls of clay that will pack well. Carefully pour in a little water to settle the improvised plug, yet not dislodge it; then add more water and start the pump. The suction developed will raise the water instantly and carry with it the easily disintegrated temporary plug you have made, plus the obstruction that caused the flap to hang up in the first place.

Switch Heater Keeps Trains on Time

Contributed by Westinghouse Electric Corp.

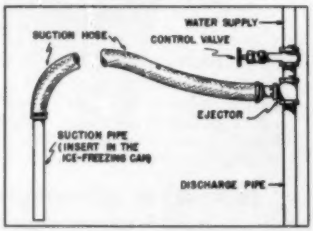
THANKS TO Corox Snow Melters, thousands of railroads and street-railway switches will operate in the coldest weather with the efficiency of summer months.

These melters are made in 5/8 in. non-erosive, nickel-silver tubing of

Melters are installed under rail head, protected from possible damage. The melters, which work on the same principle as Corox cooking units in an electric range, help clear the switches

varying lengths. The heaters can be installed under the head of the rail, where they are protected from damage. Once installed, they may be left attached throughout the year. They can be operated manually or by remote control.

Substitute Water Ejector



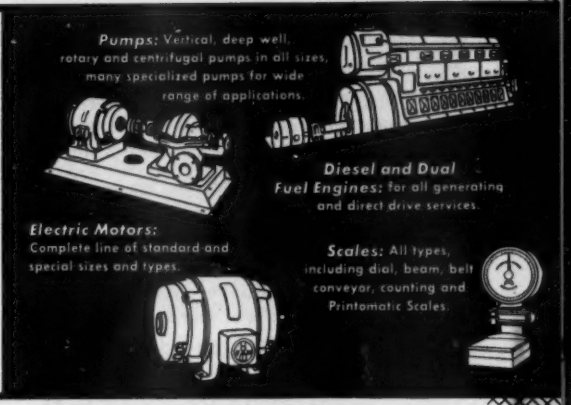
The motor-driven suction pump of a hotel ice making plant, employed to remove core water from the centers of ice freezing cans, developed a defect. A steam ejector, operating on water pressure from the regular city supply, was connected up as a substitute until the defective pump could be repaired

FOR ACTION

CALL YOUR FAIRBANKS-MORSE SALES CENTER

You can minimize procurement problems these days by depending upon your local Fairbanks-Morse Sales Center as a common source for the bulk of your requirements for electric motors, pumps, scales and diesel engines.

Fairbanks-Morse Sales Centers are staffed by factory-trained sales and service engineers who offer prompt and valuable application assistance for all Fairbanks-Morse products—as well as fast repair parts service to keep your old equipment going at top efficiency. For where to call—see the list below.


Pumps: Vertical, deep well, rotary and centrifugal pumps in all sizes, many specialized pumps for wide range of applications.
Diesel and Dual Fuel Engines: for all generating and direct drive services.
Electric Motors: Complete line of standard and special sizes and types.
Scales: All types, including dial, beam, belt conveyor, counting and Printomatic Scales.

FAIRBANKS-MORSE

A NAME WORTH REMEMBERING

THESE ARE YOUR FAIRBANKS-MORSE SALES CENTERS

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6-2893

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1550 S. State St.
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CLearwater 1-3300

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INDIANAPOLIS 2, IND.
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EAst 0131

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GAspee 1-1531

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CHestnut 7483

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80 Broad Street—HAnover 2-7470

How MICRO Precision Switches protect plant equipment . . . *Automatically*

Plant production men in every line of industry are giving old equipment new life and lowering production costs by the use of MICRO precision switches.

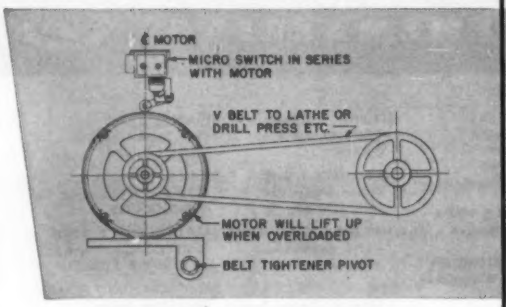
Two examples of how MICRO roller-arm actuated snap-action switches are used to make equipment safer and more automatic are shown on this page.

Your plant, too, undoubtedly has many places where these small, rugged and dependable switches can be profitably installed on present equipment as limits, safeties and interlocks. Find out today how MICRO SWITCH provides them with housings and actuators to fit your specific needs.

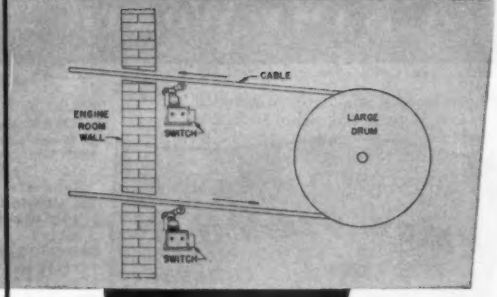
There is a MICRO SWITCH Distributor near you. They are located in over 120 cities. Look under "Switches, Electric" in your classified phone book.

There are hundreds of plant uses for this MICRO roller-arm switch

This MICRO Roller Lever Arm Actuator Switch is for use with fast cam and slide actuation and where vertical and horizontal adjustability of the arm is desirable.


MOTOR
MICRO SWITCH IN SERIES WITH MOTOR
V BELT TO LATHE OR DRILL PRESS ETC.
MOTOR WILL LIFT UP WHEN OVERLOADED
BELT TIGHTENER PIVOT

Stalling or overload of the equipment causes motor to rise slightly, actuating snap-action switch and shutting off motor. Blown fuses or motor burn-out are avoided.



Slight slackening of cable attached to mine skip actuates snap-action switch in cable slit in engine room wall, causing flasher or bell to warn engineer.

Write for your copy of "MICRO TIPS" today.

Full of practical ideas like those shown here, "MICRO TIPS" will be mailed to you regularly on request.

MICRO MS SWITCH

FREEPORT, ILLINOIS

HONEYWELL

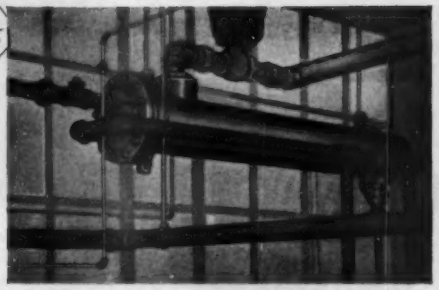
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

USE LOTS OF HOT WATER AT UNBELIEVABLY LOW COST...

because Better Washrooms and Showers mean

HAPPIER–HEALTHIER EMPLOYEES–

LESS TURNOVER– LESS TIME OUT!



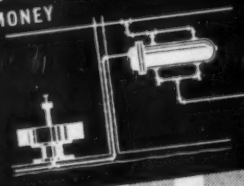
TYPICAL TACO INSTALLATION SERVES 600 EMPLOYEES with 11 wash fountains, 25 wash basins and 3 service sinks.

Don't spend a small fortune for all the clean, piping hot water your employees can use. A TACO field man will be glad to size up your problem for you. You won't have to buy a storage tank either.

MAY OUR FIELD ENGINEER GIVE YOU A DETAILED MONEY SAVING RECOMMENDATION?

JUST KNOWING WHERE TO PUT THE WATER HEATER CAN SAVE YOU LOTS OF MONEY

Makes possible short piping runs to showers and wash fountains. Steam is consumed only during the few hours a day the washroom is used.



THE WORLD'S LARGEST MANUFACTURER OF HEAT EXCHANGERS

Taco

TACO HEATERS, Incorporated • 137 South Street, Providence 3, R. I.

WE ALSO MAKE...

TEMPERING VALVES
to prevent excessively hot water

OIL HEATERS
OIL COOLERS

ELECTRIC PUMPS
for circulating water, oil and other liquids

HEAT EXCHANGERS
to utilize wasted heat

SEND FOR THIS BOOKLET

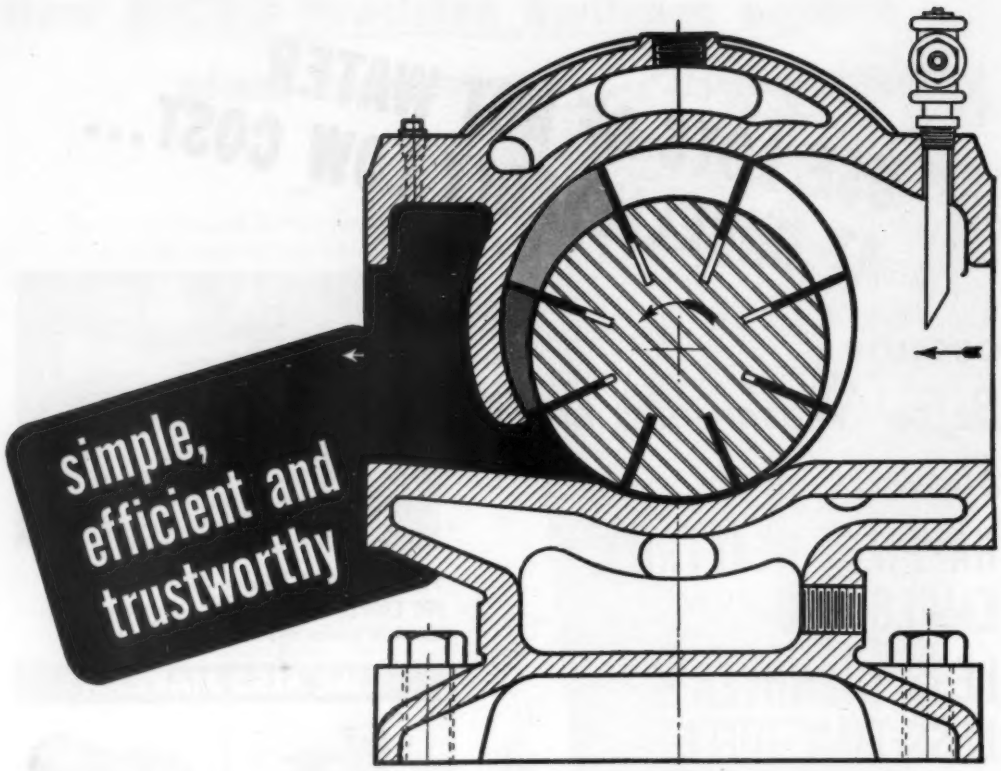
TACO HEATERS, Incorporated
137 South Street,
Providence 3, Rhode Island

Name_____

Company_____

Street Address_____

City_____ State_____



the FULLER ROTARY COMPRESSOR

For compressing gas, no reciprocating compressor can compare in simplicity and operation with a rotary.

PRINCIPLE IS SIMPLE

An eccentrically mounted, accurately machined rotor, with integral shaft, is supported on roller bearings in each of the heads. The eccentric rotor mounting leaves a crescent-shaped space, which is divided into compartments by wear-compensating blades. These slide freely in milled slots in the rotor, and are held, pressure tight, against the cylinder solely by centrifugal force. These compartments vary from minimum to maximum on the suction side, and from maximum to minimum on the compression half of the revolution. Properly designed blades, and a wide seal between rotor and bottom of cylinder, assure high and **maintained** volumetric efficiency; the multiple blades minimize pressure differences between compartments and contribute to maximum output with minimum wear.

OPERATION IS EFFICIENT

The Fuller Rotary Compressor assures a smooth flow, with no pulsations ... numerous displacement deliveries per revolution as against one in a single-cylinder piston compressor. Other advantages are: Direct drive; Compact installation; Simple foundations; Maintained capacity and efficiency; and No valves to leak. Because there are few moving parts —rotor, blades, and bearings, **maintenance time and costs are negligible.**

For further information on Fuller Rotary Compressors that will do a better job for you, write for Bulletin C-5.

Fuller

DRY MATERIAL CONVEYING SYSTEMS
AND COOLERS • COMPRESSORS AND VACUUM PUMPS
FEEDERS AND ASSOCIATED EQUIPMENT

FULLER COMPANY
Catasauqua, Pennsylvania
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C-218

these free booklets will help you!

● *To prevent rust and other corrosion of metal—to prevent deterioration of concrete and masonry*—Koppers manufactures six Bitumastic® Protective Coatings; each one of these coatings is specially formulated to control specific kinds of corrosion. Now, in one compact package, Koppers offers booklets that describe all of these coatings, and show how they can solve your plant's corrosion problems. A "Visual Index" is included, too, making it easy to find the information you want.

The factual data in these booklets will be valuable in helping you to cut plant maintenance costs. Send for a set of booklets today. Just fill out and mail the handy coupon.

Here's why Bitumastic Coatings give lasting protection against corrosion and deterioration of metal, masonry and concrete:

● **Koppers Coatings, unlike maintenance paints, are specially formulated from a tar-pitch base* that is, for all practical purposes, impervious to water.**
● **Koppers Coatings provide a tough, impenetrable barrier to corrosive elements.**
● **Koppers Coatings provide up to 8 times the film thickness of conventional paint coatings.**
● **Koppers Coatings stop corrosion caused by moisture . . . acid fumes . . . alkaline fumes . . . corrosive soil . . . salt air . . . heat.**

**Hi-Heat Gray contains heat-resistant metallic base.*

Koppers Company, Inc.
Tar Products Division,
Dept. 923-T,
Pittsburgh 19, Pa.

Please send me without charge or obligation your booklets on corrosion prevention.

Name.....

Address.....

City.....Zone....State.....

KOPPERS BITUMASTIC PROTECTIVE COATINGS
REG. U.S. PAT. OFF.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

KOPPERS COMPANY, INC., Tar Products Division, Dept. 923-T, Pittsburgh 19, Pa.
DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH AND WOODWARD, ALA.

Constructed to Take Severe Punishment

Without Tube Swelling

CONCORD #20 STEAM HOSE

Here's the steam hose with a structural difference that eliminates . . . once and for all . . . the common failure of tube swelling under continuous high pressure operation.

CONCORD #20 Steam Hose gives you the exclusive protection of a tough inner lining . . . a lining of stainless steel wire braid. This braid assures permanent retention of the original inside hose diameter. It prevents swelling and constriction of the tube . . . assures full flow of steam at all times . . . permits re-coupling in the field when necessary, without the slightest difficulty.

In addition, CONCORD #20 construction features include: two or three braids (depending on size) of alternate high tensile steel wire and rubber layers are firmly bonded over the outside of the tube. They provide maximum burst-protection and safety. An asbestos braid provides positive cover adhesion and serves as cover insulator. On top of all is the rugged, abrasion-resistant cover that withstands the severest abuse.

Flexible, tough and dependable . . . that's BWH's new CONCORD #20! Ask your nearby BWH distributor for a demonstration. Get in touch with him today, or write us direct.

Tube Securely Locked by Special Stainless Steel Inner Wire Braid!

Illustration above shows how exclusive inner stainless steel braid of CONCORD #20 Steam Hose prevents tube swelling and assures long life under severe use.

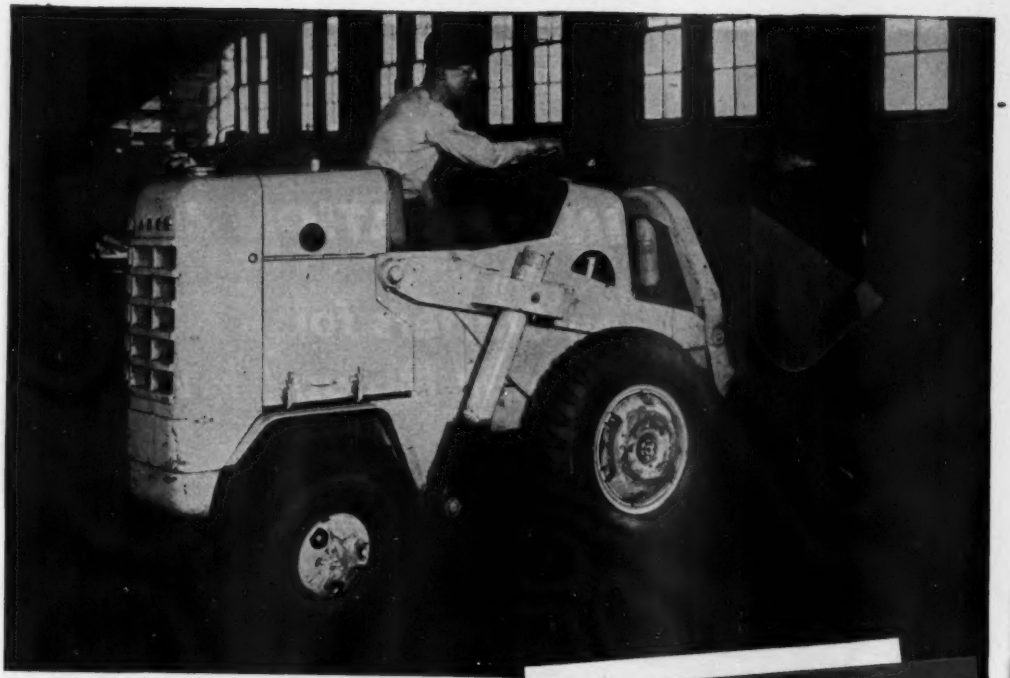
Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BWH
DEPENDABLE RUGGEDNESS



mechanize your manpower

Take the shovel out of a man's hand and put him on the seat of a PAYLOADER. He'll show you how to lick rising costs, how to increase output and solve manpower shortages. Thousands of plants with bulk materials to handle have taken this step with highly gratifying results. And PAYLOADERS can do so many jobs that there is hardly any limit to their usefulness.

Every PAYLOADER is a complete Hough-built tractor-shovel specifically designed with multiple reverse speeds and other features that insure fast, low-cost bulk material handling. There are several sizes from the 12 cu. ft. Model HA shown, up to 1½ cu. yd. bucket capacity. They are also available in front-wheel, rear-wheel and four-wheel-drive models.

Every PAYLOADER is backed by 30 years of material handling equipment manufacture and a Hough Distributor with complete parts and service facilities. The Frank G. Hough Co., 770 Sunnyside Avenue, Libertyville, Illinois.

On These Jobs

- Unload box cars.
- Dig and carry fertilizers, chemicals, all loose materials.
- Transport and distribute materials from storage to process.
- Unload trucks.
- Load box cars.
- Feed conveyors, hoppers, baggers, elevators.
- Stockpile coal and all kinds of raw materials.
- Clean up gangways, aisles and other areas.
- Handle coal, coke, ashes, cinders.
- Carry bagged materials, bales, barrels.
- Maintain private roadways.
- Do cranework — haul, push.
- Remove snow.

HELP for your material handling problems is found in "Industrial Handling" the free Hough magazine. Catalog on any size PAYLOADER is available, without obligation.

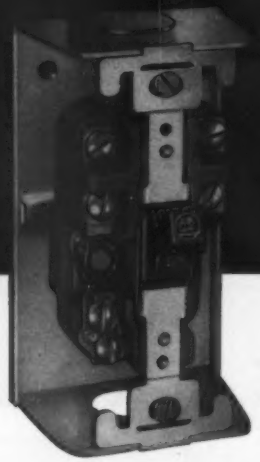
SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

SAVE 30% to 40% of INSTALLATION TIME

on Starters for Small Motors (1 hp or less)



BULLETIN 600

Manual Starting Switches with Overload Protection

•

No Need to Remove Starter from Enclosure

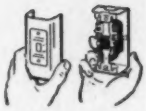
Installation of the Bulletin 600 Starting Switch is so simple that contractors have saved as much as ten minutes in installation time. In addition, they have found the switch exceptionally reliable.

•

GENEROUS WIRING SPACE
ATTRACTIVE APPEARANCE
SIMPLE DESIGN

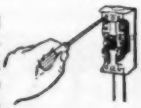
STEP 1—REMOVE COVER

Simply remove two screws on the front of the Bulletin 600 Starting Switch and the metal cover slips off, exposing the front and two sides of the switch.



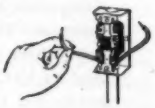
STEP 2—MOUNT UNIT

Mount the switch on the wall with two screws. Conduit openings on top, bottom, and back permit easy connection. No need to remove the starter from the box.



STEP 3—PULL IN WIRES AND CONNECT

Because the compact mechanism allows ample space, wires can be pulled into the box and connected to the terminals without removing the switch from the enclosure.



STEP 4—PUT COVER BACK ON

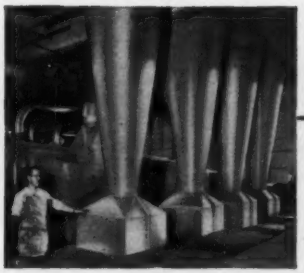
Finally, with the job completed, the cover is slipped back on, and two screws hold it firmly in place. The entire operation is simple and easy. It saves time and money.

Allen-Bradley Co.
1317 S. First St. Milwaukee 4, Wis.

A-B Quality

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

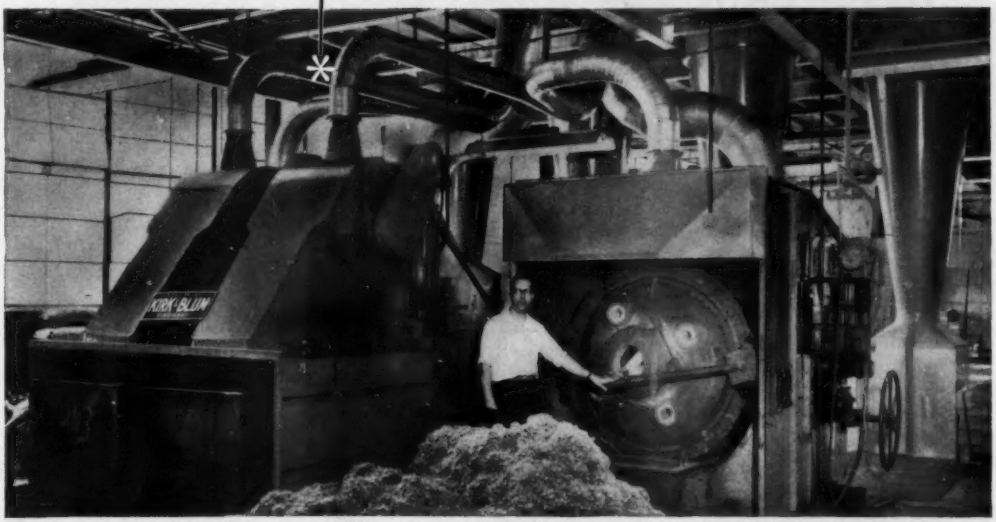
KIRK AND BLUM DUST CONTROL SYSTEM



Safeguards Workers

Saves Valuable By-products

....PAYS FOR ITSELF!



* One of two tilting reduction furnaces. Babbit trimmings are melted down, separated from steel parts and other foreign matter.

In the reclamation of costly automotive babbit alloy in a reduction furnace, toxic fumes and lead oxide dust are formed. The lead oxide dust is as valuable as it is hazardous. KIRK & BLUM was called on to solve this problem.

For each of two reduction furnaces (one shown in photos) a complete enclosure was provided. No dust or fumes can escape to the room. The enclosure is exhausted to a battery of four KIRK & BLUM high efficiency centrifugal collectors which separate the lead oxide dust. Four to five hundred pounds of this valuable by-product are reclaimed each week. From a "safety" and also a "salvage" view point the efficient system has proved a fine investment, which will pay for itself in a short time.

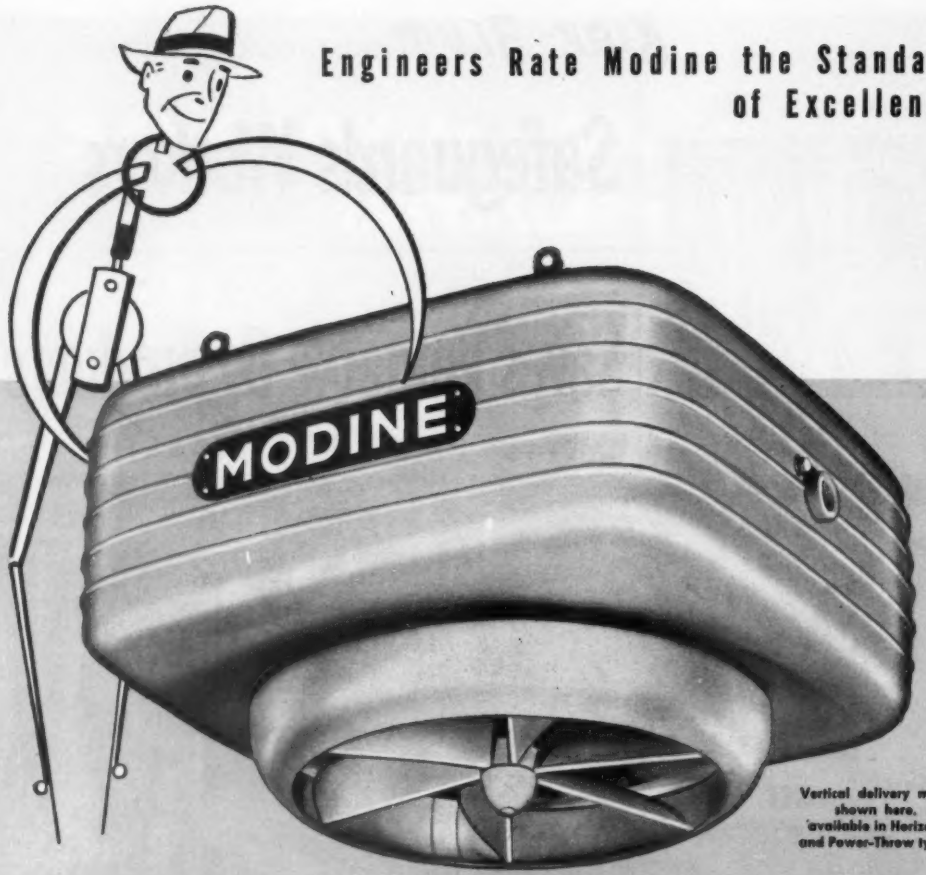
Air handling problems solved by the Kirk & Blum organization cover every phase of industry. Further examples are illustrated and described in a catalog, "Fan Systems for Various Industries." Copy on request.

KIRK AND BLUM

DUST CONTROL SYSTEMS

THE KIRK & BLUM MFG. CO.
3189 Forrer Street Cincinnati 9, Ohio

Engineers Rate Modine the Standard of Excellence



Vertical delivery model shown here. Also available in Horizontal and Power-Throw types.

Six of many outstanding features that

Modine design promotes mixing of room air and heated air leaving condenser. Result: increased air volume and velocity . . . lower outlet temperatures.

Parker-Bonderizing provides rust-resistance for casings and other sheetmetal parts — anchors paint to steel — preserves the fine finish longer.

Versatile control of air delivery is provided by Cone-Jet, Truncone or Louvre deflectors. You can choose the *right* one for your job at no extra cost.

COMPARE FIRST

...YOU'LL CHOOSE MODINE UNIT HEATERS

Advanced engineering... superb styling... highest grade materials and craftsmanship — all quality hallmarks of Modine Unit Heaters. They're your assurance of *heating performance at its best* — high fuel economy... years of trouble-free service. Built to a standard of excellence — Modine is the choice for unfailing dependability, lower operating and maintenance costs. So whether you need Vertical Delivery Models (illustrated), Horizontals or Power-Throws — *compare first!* Modine Mfg. Co., 1563 De Koven Ave., Racine, Wis.

U-1111

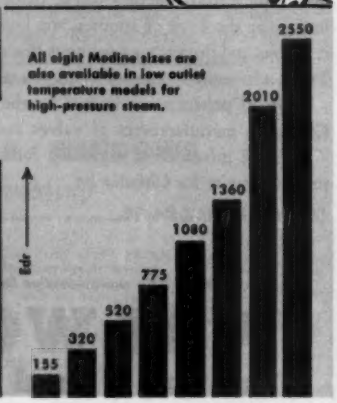
Write for Bulletin 149-A, "Modine Unit Heating." Or contact your Modine representative listed in the classified section of your phone book.

Modine UNIT HEATERS

account for the Modine quality reputation

Cooling sleeve protects motor when fan is not operating — safeguards against condenser radiant heat. A frequent cause of failure on ordinary heaters.

Discharge air temperatures of 110°-120° F. are correctly related to air velocities — assure perfect heating comfort plus lower fuel costs.



Big Modine Vertical Units for big defense plants eliminate expensive ductwork, retain the flexibility necessary for subsequent changes in plant layout.

NOBODY GUESSES WHEN YOU USE . . .

WALSEAL*

FOR MAKING SILBRAZ* JOINTS

When you see this fillet of alloy, and the fitting is Walseal you know that you have penetration because the alloy comes from the inside.

Cutaway view of a Walseal Tee showing: 1—factory-inserted ring of silver brazing alloy; 2—fillet of silver brazing alloy that appears upon completion of Silbraz joint; 3—cutaway view of the completed Silbraz joint showing that silver brazing alloy has flowed in both directions from the factory inserted ring.

When you make Silbraz* joints in your brass, copper, or copper-nickel pipe lines with Walseal Valves, Fittings, or Flanges you know you have the right amount of the correct type of silver brazing alloy. The ring of Sil-Fos brazing alloy is factory-inserted in the ports of Walseal products at the time of manufacture.

No lost time or motion in handling the alloy . . . no difficulty in getting full penetration of the alloy regardless of the position of the valve or fitting . . . no guessing whether the joint is made right . . . the fillet of alloy that shows up when the Silbraz joint is completed, comes from the inside!! And, whether you've made the Silbraz joint yourself, or inspecting the work of another, you know that if the silver alloy fillet is visible, and the valve or fitting is Walseal, you have full penetration. That's why nobody guesses when you use Walseal!

Walseal products are backed by the reputation of the Walworth Company, manufacturers of valves and pipe fittings since 1842.

For full information regarding Silbraz joints made with Walseal products, write for Circular 84.

**Patented—Reg. U. S. Pat. Off.*

Recommended for

- Hot and Cold Water Circulating Systems
- Boiler Feed Lines
- Steam Return Lines
- Condensate Lines
- Low and High Pressure Air Systems
- Lubricating Oil Circulating Systems
- Industrial Gas Piping
- Solvent and Vacuum Piping Systems

Make it "a one-piece pipe line" with WALSEAL

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

When protesting demonstrated the superiority of Fenestra Building Panels, Oak Ridge began using them in very large quantities.

Oak Ridge Gets Fast Construction, High Insulation, Great Flexibility with Fenestra Panels

Buildings leap up instead of creep up . . . because with Fenestra* "C" Panels you build by areas instead of by inches.

These rugged, rigid sandwiches of metal and glass fibre insulation give you strong, lightweight construction that saves materials, man-hours and money.

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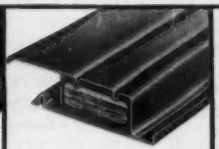

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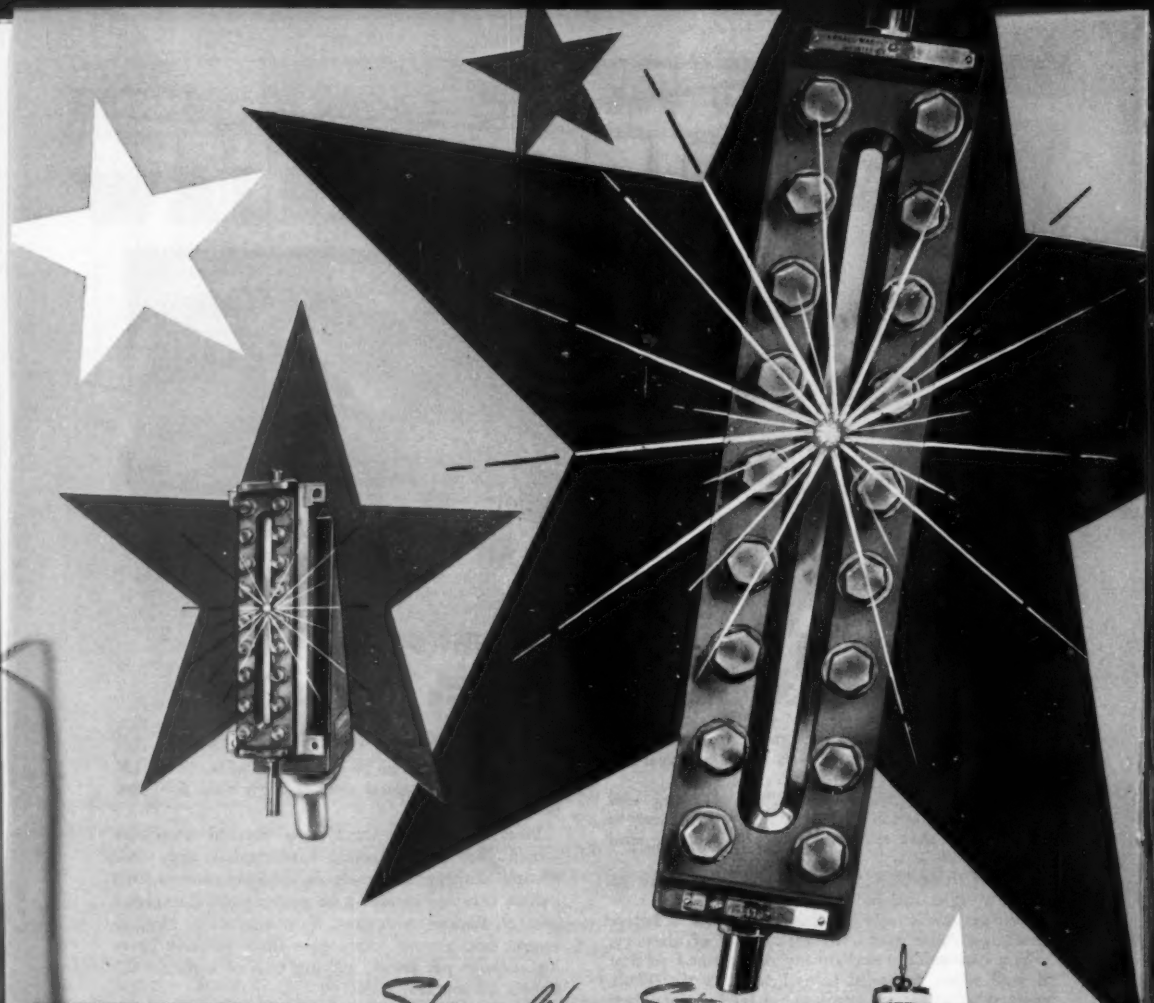

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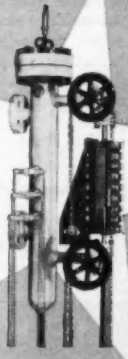

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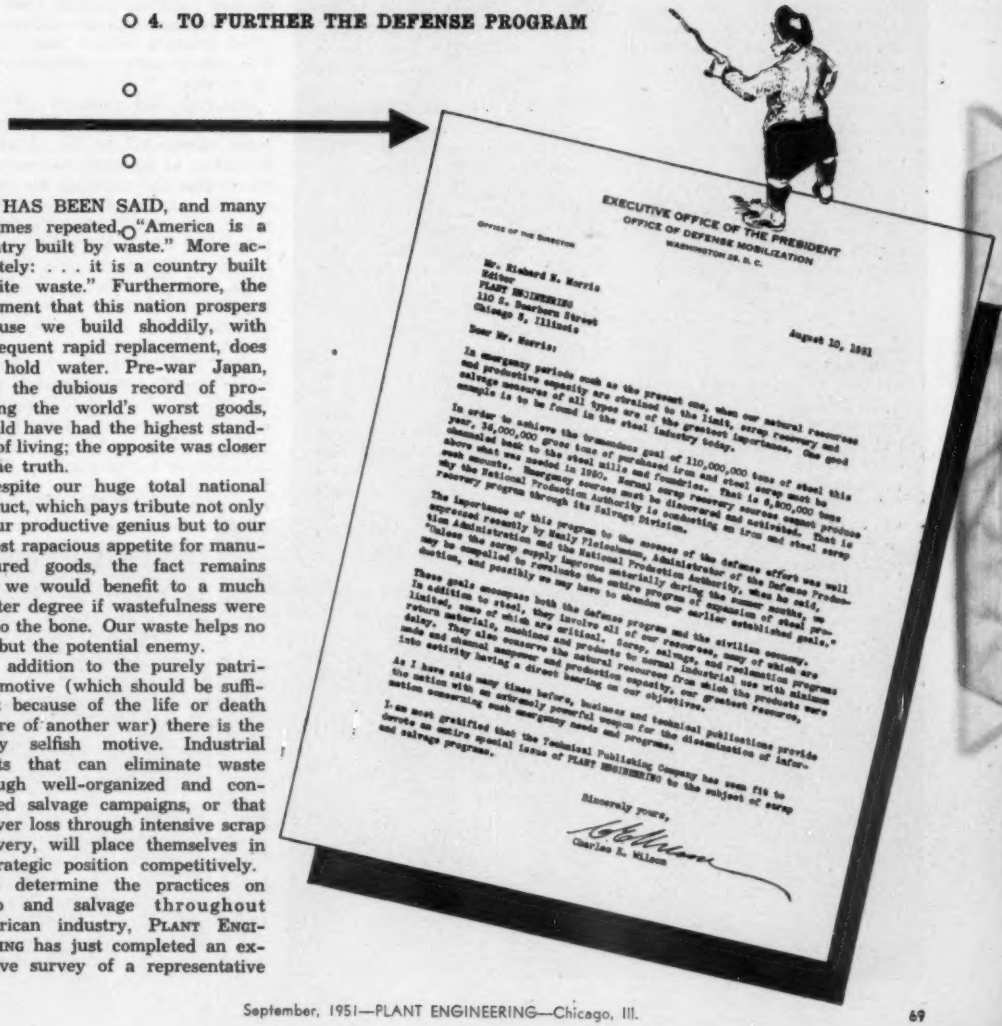
3. TO RECLAIM SCARCE PRODUCTS
4. TO FURTHER THE DEFENSE PROGRAM

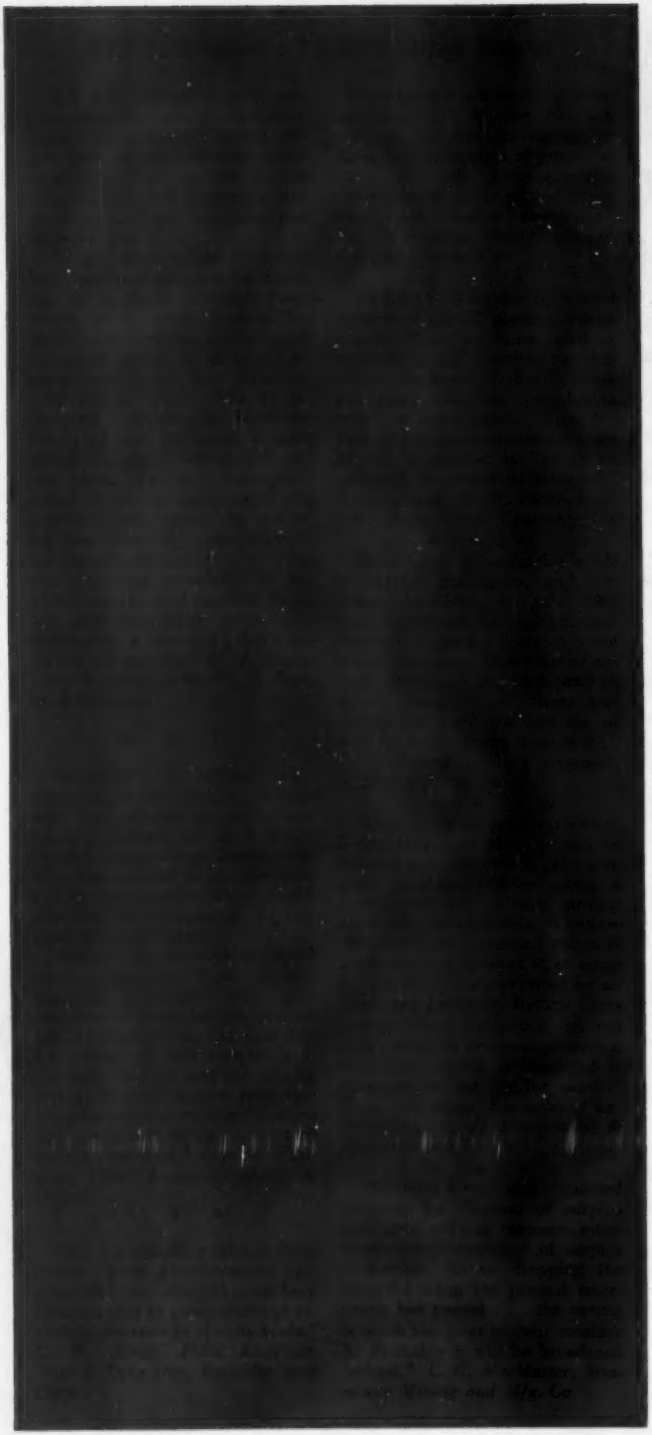

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF DEFENSE MOBILIZATION
WASHINGTON 25, D. C.
Mr. Richard H. Morris
Editor
PLANT ENGINEERING
110 S. Dearborn Street
Chicago 3, Illinois
August 10, 1951
Dear Mr. Morris:
In emergency periods such as the present one, when our natural resources and productive capacity are strained to the limit, scrap recovery and salvage measures of all types are of the greatest importance. One good example is to be found in the steel industry today.
In order to achieve the tremendous goal of 110,000,000 tons of steel this year, 34,000,000 gross tons of purchased iron and steel scrap must be charged back to the steel mills and foundries. Normal scrap recovery sources cannot produce what was needed in 1950. Normal scrap recovery sources must be discovered and cultivated. That is why the National Production Authority is conducting an iron and steel scrap recovery program through its Salvage Division.
The importance of this program to the success of the defense effort was well expressed recently by Manly Fleischmann, Administrator of the Defense Production Administration and the National Production Authority, when he said, "Unless the scrap supply improves materially during the present months, we may be compelled to reevaluate the entire program of expansion of steel production, and possibly we may have to abandon our earlier established goals."
These goals encompass both the defense program and the civilian economy. In addition to steel, they involve all of our resources, many of which are limited, some of which are critical. Scrap, salvage, and reclamation programs return materials, machines and products to normal industrial use with minimum delay. They also conserve the natural resources from which the products were made and channel manpower and production capacity, our greatest resources, into activity having a direct bearing on our objectives.
As I have said many times before, business and technical publications provide the nation with an extremely powerful weapon for the dissemination of information concerning such emergency needs and programs.
I am most gratified that the Technical Publishing Company has seen fit to devote an entire special issue of PLANT ENGINEERING to the subject of scrap and salvage programs.
Sincerely yours,
Charles E. Wilson

IT HAS BEEN SAID, and many times repeated, "America is a country built by waste." More accurately: . . . it is a country built despite waste." Furthermore, the argument that this nation prospers because we build shoddily, with consequent rapid replacement, does not hold water. Pre-war Japan, with the dubious record of producing the world's worst goods, should have had the highest standard of living; the opposite was closer to the truth.

Despite our huge total national product, which pays tribute not only to our productive genius but to our almost rapacious appetite for manufactured goods, the fact remains that we would benefit to a much greater degree if wastefulness were cut to the bone. Our waste helps no one but the potential enemy.

In addition to the purely patriotic motive (which should be sufficient because of the life or death nature of another war) there is the solely selfish motive. Industrial plants that can eliminate waste through well-organized and conducted salvage campaigns, or that recover loss through intensive scrap recovery, will place themselves in a strategic position competitively.

To determine the practices on scrap and salvage throughout American industry, PLANT ENGINEERING has just completed an extensive survey of a representative



cross-section of its readership. We queried these readers on present and planned programs for scrap and salvage; on the approximate dollar value of products, machines and materials reclaimed or sold; whether the program was inaugurated primarily to lower costs or to retrieve scarce materials.

Estimates of the cash value of the salvage programs were revealed by the survey to run from $12,000 annually to $1,500,000 per year. These figures reflect the profit to the companies after having deducted the cost of operating the programs. Bookkeeping systems varied but generally the salvage department—when such a department was established as an entity—was operated as a small business within a business; it was charged rental and its raw material (salvage from the other departments) was charged to it on either a weight basis or on a man-hour basis established by the entire plant.

Materials and products salvaged (not to be confused with scrap) were discovered to be about as numerous as the products manufactured, plus the materials the products were made of. Some of these were: structural steel, defective auto parts, iron, brass, copper, cardboard, machine parts, pipe, pipe fittings, valves, motors, switches, starters, transformers, cork, tinplate, castings, cloth trimmings, wood, bronze, aluminum.

Also included in the tabulations were: barrels, drums, burlap, rubber, fabrics, oils, abrasives, abrasive cloth, pipe covering, steam equipment, molding sand and glassware.

In answer to the question: "Does your company have an organized salvage program? 45.6 per cent replied in the negative; 64.4 per cent said that they did. Many in the latter category, however, indicated that . . . ". . . program could be improved upon . . . " . . . is not completely integrated." . . . " . . . but is very small." . . . "We have a salvage program but it is not particularly 'organized.'"

Perhaps, to the nation as a whole, iron and steel scrap is the most important segment of any scrap and salvage campaign; on the other hand the procedure of returning scrap to the steel mills of the country is far simpler than even the most elementary salvage program. The scrap dealers are a well-organized and vocal group; scrap commands an excellent, though controlled, price; and its shortage is being dramatized by practically every means of communication.

Salvage Cleaning Line Cleans Up for Hooker Electrochemical

Pilot line for testing company's cleaners are used by firm to demonstrate effectiveness of product while rescuing over $20,000 worth of scarce items . . . Details on operation of cleaning line and use of cleaner

By A. VAUGHAN CHINNOCK, Hooker Electrochemical Co.

IN ONE YEAR Hooker Electrochemical Company, Niagara Falls, New York, has salvaged over $20,000 worth of materials, some of them irreplaceable items, at a total cost of approximately $3,000. Oddly enough and satisfyingly so, it is one of the company's own products which, used in a simple process, permits the rehabilitation of a variety of valves, pipe fittings, and chemical equipment including pumps, cooling coils, and miscellaneous alloy parts. The company's Stores Department reported that over $12,000 worth of materials were completely cleaned and returned to stores for reuse. The materials cleaned included cast iron and steel flanges, nickel pipe, miscellaneous pipe fittings, nuts, bolts, scrap nickel and Hastelloy C.

In addition, 190 assorted nickel and alloy valves which had previously been rejected for repair by the manufacturer were processed and then were acceptable for reconditioning. To date 132 of these valves have been returned to us factory reconditioned at a cost of $1,750. The current replacement value of these valves is $8,588.

Several pieces of equipment have also been cleaned for the Maintenance and Repair Department with a notable time saving over conventional methods of steaming, brushing, scraping. Six pumps varying in size from 1½ in. to 2 in. and of various alloys and makes, a nickel cooling coil and a large fan wheel were all thoroughly cleaned in six man-hours time.

In addition to the savings in money and time reported above, the salvage report states, "Under present conditions the dollar saving does not tell the whole story. By returning cleaned scrap nickel to the equipment manufacturer, we were able to get nickel pump parts which would otherwise have been unobtainable."

For a number of years Hooker has manufactured a descaling salt which is widely accepted in the stainless steel industry for descaling. More recently a modified form of the product, Virgo Molten Cleaner, was developed for desanding castings and other metal cleaning applications. A logical test of the new product was the salvage operation conducted in Hooker's pilot plant equipment.

The operation of the process is relatively simple and rapid, and unlike conventional acid pickling operations does not attack the base metal of the parts being cleaned. The unit used for salvage operations consists of a molten salt bath operating at a temperature of about 850 F, a water quench tank and an acid dip tank. The parts to be cleaned are held in the molten bath for about 15 minutes, followed by a water quench, and then are dipped in dilute muriatic acid for one or two minutes.

The actual time for the dip will vary with the nature and amount of adhering materials to be removed from the parts. Depending upon size and shape, the parts to be cleaned may be held in baskets, chained in bundles or suspended upon hooks. Any metal or alloy which is not adversely affected by molten caustic at the operating temperature of the bath may be treated by this process.

Since the bath is a fused salt at a temperature of 850 F, certain precautions had to be observed in its operation. All materials placed in the bath were first freed from moisture to prevent spattering of the bath. Greases and other organic matter will generally burn at the bath temperature and provision had to be made for exhausting such fumes and smoke.

Pipe fittings suspended over molten salt bath before cleaning; salt bath cleaning line; and the same fittings after cleaning

Army's Property Disposal Division makes Brooklyn its testing ground for Army-wide utilization of conservation . . . Successful application applied to lumber, metal, junk, and miscellaneous salvage operation . . . Paper salvage alone shows a thousand dollar a month profit since October of last year

How to Turn Waste Paper into Hard Cash

Fig. 1. Bags of sorted waste paper at Brooklyn Army Base of New York Port of Embarkation being emptied into the automatic baler just before being sold

By FLOYD McKNIGHT

CONSERVATION practices and economy in the salvage reclamation project of the Army's New York Port of Embarkation warrant close study by plant engineers. Operations of the Property Disposal Division of the Port, headed by Capt. J. G. Remy, are centered at the Brooklyn Army Base and on Staten Island.

These two plants serve as a testing ground for Army-wide studies and developments, designed to prevent waste and convert otherwise wasted materials into profits. Careful management and close co-operation with other defense and governmental agencies promise to render the project even more useful.

Newest aspect of the undertaking is the systematic sorting, baling and sale of paper that would otherwise be destroyed as rubbish. The waste paper project, initiated in October, 1950, has already demonstrated its worth. Practically, it is but an extension of principles long utilized by the military for converting lumber, scrap metal and junk into useful materials or cash.

The Army quickly classifies such material into either salvage or surplus. Many items discarded by one military or government organization can be used by another. A large photostatic machine is a case in point. Stoves, lawnmowers and countless other items can be cannibalized and one good piece made out of the parts of three, four or five unserviceable ones. When it is fairly certain that a discarded item is usable within the military or governmental organizations, prospective users are circularized until a taker is found.

Some material is never salvaged for use by other units or branches but in Army terminology is classed as "surplus" and is sold. Waste paper, the newest item in the property disposal program, is always sold. As in the case of other waste products, the sale is by the sealed-bid method to waste paper dealers who pick up and deliver the product.

Paper is classified and sorted before baling into categories as: corrugated; ledger; newspaper; book; tabulating card; No. 1 mixed; and ordinary waste paper. Each grade brings its own price on the market, and the price levels are constantly shifting. For example, corrugated was bringing approximately $55 a ton or higher at the time of going to press, whereas some fine papers from outdated books were bringing over $170 a ton. White tabulating cards bring more than colored.

Only 65 per cent of the paper baled at the Port emanates from the

Fig. 2. Capt. J. G. Remy, Property Disposal Officer, inspects a week's crop of baled paper preparatory to issuing an invitation to bid. Weights in pounds are pencilled on bales

Fig. 3. Scrap metal, already sold, is loaded on a bidder's truck for removal

premises. The remaining 35 per cent comes from other installations in the area including, Fort Hamilton, Fort Totten, Fort Tilden, the Signal Photo Center in Long Island City and the Belle Mead General Depot in Somerville. Most of the sorting of paper from other installations is done by the time it reaches the Port and the different types of paper arrive packaged in burlap bags.

Operators dump the contents of the bags into the baling machines. The Port maintains two mechanically operated balers, each with a 500 to 600 lb capacity depending on the weight of paper being baled, and one hand baler with a capacity ranging from 100 to 150 lb.

All the paper baling operations take place at the Brooklyn Army Base. Here the Property Disposal Div. has 2,800 sq ft of office space; 28,480 sq ft of warehouse area; 8,600 sq ft of lumber reclamation space; a salvage yard of 52,000 sq ft; and a scale house with a 100 t scale occupying 7,675 sq ft. In addition to these facilities, the Division has more than 100,000 sq ft of space, used mainly for lumber operations, at the Staten Island Base.

In office and warehouse and on the baling machines, the Division maintains a staff of fifty-five persons, of whom thirty-six are engaged in lumber operations. Three men are normally assigned to paper baling working for 8 hr at an average wage of $1.41 per hour. For March wages totaled $774.48 and during this period 119 bales of different types of paper totaling approximately 65,845 lb were processed. Labor costs were therefore about $6.25 per bale or $23.60 per ton. For the 6 mo period October 1950 to March 1951 inclusive, labor costs have averaged $645 per month and gross receipts $1715 showing a profit of $1070 on the operation.

Installation of a paper shredder, now on order, will add to the quantity of paper sold by making it possible to include restricted material which cannot now be sold through the existing paper disposal set-up.

Fig. 4. Operators remove nails from lumber in course of reclamation processing

Salvage and Saving In a Textile Mill

"Our mills have carried on an organized salvage program for many years. The principal materials covered, of course, involve cotton or cotton products. We normally reclaim as much cotton as possible for re-use in manufacturing processes. Cotton or cloth wastes not re-usable are sold through established waste channels for use in other products.

"This program was primarily initiated on a cost basis and will be carried out to the highest degree possible in future years. Cotton, of course, is not a scarce material so this factor does not influence our thinking. Naturally, the higher the cost of raw cotton the more valuable our re-usable waste becomes.

"Over the years we have removed, from time to time, old machinery to make room for more modern equipment. This is a continuing job in the textile industry due to the highly competitive nature of its operations. Wherever possible the machinery removed is put to use in another mill. Where this cannot be done the machinery is sold through established used-machinery dealers. Some items which may be required again in future years are placed in storage until they are needed.

"As a matter of interest, we recently removed from service a boiler installed in 1910. The boiler was reduced to scrap and sold; even as scrap it brought one-half the dollar cost of the original boiler. A new boiler of the same size to replace this unit is costing us approximately twelve times as much as the original equipment. This is a most revealing picture of the change in dollar values during the past years." *Robert J. Tucker, Plant Engineer, Roanoke Mills Company.*

Plant Engineer Tucker's experience with the value of salvage programs parallels that of other "Plant Engineering" readers. For additional comments on salvage programs now in effect see excerpts from letters, appearing on page 70 of this issue—Editor.

Fig. 1. A good salvage and reclamation program requires planning; this group at Convair is studying ways and means to eliminate scrap and surplus. Co-Author Watkins is fourth man from left in picture

Salvage at Consolidated-Vultee Pays Off at 10 to 1

Convair's C-Men (for conservation) made a million dollars last year, now they are bucking for two . . . Well-planned organization which consists of four sections: Prevention Group, Remnant Stores, Reclamation Group and Disposition Group, could make the goal possible with an estimated $2,200,000 in 1951 . . . Paying the company and the country's taxpayers a profit of approximately $10 to every $1 spent, the C-men rightly feel they are performing a worthwhile service for defense

By F. C. CLAYTON, Chief Plant Engineer, and
W. B. ATKINS, Material Conservation Supervisor,
Consolidated Vultee Aircraft Corp., Fort Worth, Texas

EXPANSION of Consolidated-Vultee's salvage operation into the present Material Conservation Section brought to light a refreshing attitude on the part of the people chosen to operate it. More noteworthy than the actual goods handled or the money saved is the sincerity and interest of these workers who feel that they are contributing something of value to the people of the United States who own the plant and whose tax money is being spent.

Predating the formation of the Material Conservation Section is a series of studies made to determine the potential returns from such a program. Out of the studies came a department composed of four groups: Prevention Group, Remnant Stores, Reclamation Group and Disposition Group.

Most effective, but least spectacu-

Fig. 2. T-shaped extrusion was left over from previous order and was sent to Remnant Stores on chance another order might require a short piece like it

lar of the groups is the Prevention Group, charged with the elimination of waste and scrap. This is done largely through an educational campaign which is carried on continuously. However, a considerable amount of industrial engineering is involved. Since prevention does not represent scrap sold or salvage returned, it is difficult to put a dollar value on this operation, but it is felt that its effectiveness outweighs that of other phases of the operation.

Remnant Stores has proved to be valuable in the conservation of all usable cut-offs of sheet metal, bar stock, tubing, extrusions, etc., received from production, tooling, and maintenance departments. Specifications have been set up establishing minimum sizes of each type and gauge of material which will be sent to Remnant Stores rather than to Reclamation. These materials are then stocked and all stores requisitions routed through the Remnant Store before being filled from new stock.

Reclamation Group makes the biggest showing dollarwise. It is the principal responsibility of this group to receive and review all scrap, rejections and damaged parts for possible reclamation of fittings, portions of materials and similar items, and to screen, sort and return to stock from floor sweepings all usable parts and materials.

These vary from small but highly valuable aircraft nuts and bolts and patented fasteners, to special aircraft parts which cost many dollars apiece. During its first year of operation under the "stepped-up" conservation program 1,912,367 items were returned to stock; otherwise, these would have been lost or sold as scrap.

Disposition Group represents the final stage of the salvage and conservation operation, having responsibility for disposing of generated scrap such as turnings and borings, all unsalvageable remnants, and also for the sale of rejected, obsolete or surplus material which is often of great value to another manufacturer.

Fig. 3. Worker in Reclamation Group sorts rivets, clamps and other pieces swept off plant floor. Usable items are returned directly to Production department

Fig. 4. Blueprints which are of no further use are shredded in this machine and then baled. They are used to pack B-36 parts for shipment to other points

Fig. 5. The versatile lift truck with an attachment loads aluminum chips which bring 10¢ a pound. A two week's accumulation of aluminum chips is worth about $3,500

Fig. 6. Heavier aluminum scrap is loaded into a rail car with aid of yard crane. This scrap consists mostly of pieces which were too small to be salvaged and sent to Remnant Stores

Detroit Edison Salvages Millions

Always known as one of the most carefully and economically managed segments of the National economy, the electric utility industry has a sound representative in Detroit Edison Company . . . Everything from lamp bulb bases to old power houses are grist to the mill of the Stores' Salvage Division which helps Detroit Edison protect the financial interests of customers, employees and stockholders

CINDERS AND FLY ASH, poles, switches and insulators, are but a few of the items salvaged by Detroit Edison Company. In fact, the big brick building which houses the Stores Salvage Division at Del Ray is a salvage item itself; formerly it was Del Ray Power House No. 2.

One key to successful operation of the salvage division is the company's continuing program of promoting the reuse of many of the salvaged items. As Detroit Edison puts it: "Salvage operations at our company can continue to be successful only if the steady flow of items into salvage is duplicated by an equal readiness on the part of various departments to take back salvaged materials for reuse."

According to Tom Nickelson, head of the Stores Department, Detroit Edison last year handled over $3,000,000 of such material.

For example, wire is one of the products which Detroit Edison salvages in large quantities. Pieces of wire that are in good shape are spliced, the joints are taped and the reels are weighed for records. This wire then goes back on the lines. Some wire gets the furnace treatment to remove broken and damaged insulation. Once the insulation is removed the copper is sold as scrap or is cut up in short pieces to be used as tie wires to insulators. Over 2½ million pounds of wire were brought to the Delray Salvage station last year.

In addition, the Salvage department splices cable to make continuous sections for urban installations. Another type of wire which is salvaged is appliance cord. Last year more than 350,000 such cords were exchanged by the Utility's customers.

Should new cords become scarce, salvage men will cut off the ends of the old cords, attach new plugs, wind frayed spots with thread, dry clean the cords and return them to stock.

These painstaking attentions to detailed procedure and seemingly insignificant low-cost items have paid off handsomely for Detroit Edison.

Fig. 1. Another load of wire odds and ends is delivered to the salvage department at Del Ray Station. Pieces of wire that are in good shape are spliced, joints are taped and the reels are weighed. Unredeemable pieces are stripped of their insulation and then sold as scrap, or cut up in short pieces to be used to tie wires to insulators

Fig. 2. Above: These aren't oranges but old lamps being put through a crusher located at Del Ray. During 1950 over 11,000,000 bulbs passed through the crusher. The brass ends are salvaged; 1950's total amounted to more than 90,000 lb

Fig. 3. Poles are shown here getting a shaving at Detroit's Fenkell Warehouse. Knives, whirling at high speed to remove splinters and to loosen bits of wood, can resurface a 40-ft pole in three minutes for return to like-new shape

Fig. 4. Right: Worn-out desks and chairs are not thrown away. Damaged or tired office furniture is refurbished in the company's Building Operation's Carpenter Shop. Office machines are similarly salvaged by Accounting Service. All departments of the Company, both office and plant, are cautioned to be careful in handling equipment of all types. Everything is considered to be of value until a salvage expert has made an examination and has condemned it

Fig. 5. Below: Cross arms are saved, the good pieces are cut out and they are used as spacers for overhead lines. At right in the photo is a cross arm damaged by fire. Detroit Edison has a contract with Detroit League for the Handicapped, and Goodwill Industries of Detroit for such work. Thus, they do a good turn for themselves and community

Fig. 6. Below: One of the major items in any utility company, as well as most industrial plants, is the cost of replacing hand tools. At Del Ray, damaged tools are given a new lease on life. Shown at right in photo are examples of what some tools look like when sent to salvage; at left, the way similar tools look when salvage has been completed

New Lumber from Old Hits Defense Jackpot

By W. W. GRANBERG

Salvage operations on ships dunnage adds $45 to $55 value per thousand board feet . . . The secret of economical operation is good planning, proper equipment and accumulation of supply to permit a run of several days . . . J. Bach who developed the reclaiming procedure for the Seattle Port of Embarkation tells here how it is done

MAKING NEW LUMBER out of old is one of the several activities of the salvage department of the Seattle Port of Embarkation. It is also profitable; 900,000 board feet were reclaimed in the last 6 months of 1950 at a saving of $37,000 over the cost of new material. The net value of the lumber reclaimed during the entire year was $85,000 and the quantity for 1951 bids fair to exceed last year's total for some 226,000 bf were salvaged in February alone.

Salvage Adds $55 per M

Actual cost of reclaiming the lumber amounts to $9 per 1000 bf, as compared with a price of $55 to $65 per thousand for new lumber. The source of the reclaimed lumber is ship's dunnage. As it is removed from the vessels it has a value as salvage of $10 per 1000 bf. This means the salvage operation enhances its value by $45 to $55 per thousand so far as its reuse as dunnage is concerned.

Salvaging is done on a production-line basis developed since reclamation started 5 yr ago on a small scale. Lumber is brought to the salvage yard in slingloads as removed from the ships, full of nails and with ends broken. For economical operation supply of dunnage sufficient for a weeks work is accumulated before salvaging begins.

When the operation gets under way, lift trucks place the lumber on sawhorses at the head of the line. Workmen remove nails from the boards. A few feet away is a swing cut-off saw and the lumber is pushed to it on rollers to have the ends squared. As it leaves the saw the lumber is pushed onto the sorting table where transfer chains carry it to sorters.

Six Men Do Job

This table is 60 ft long, 15 ft wide and has four chains powered by a 3 hp motor operating through a reduction gear to drive the table at a speed of 50 fpm. Sorters pick it off as it passes and stack it according to dimensions. These piles, 40 in. high, are picked up by straddle trucks and moved to the new lumber storage area.

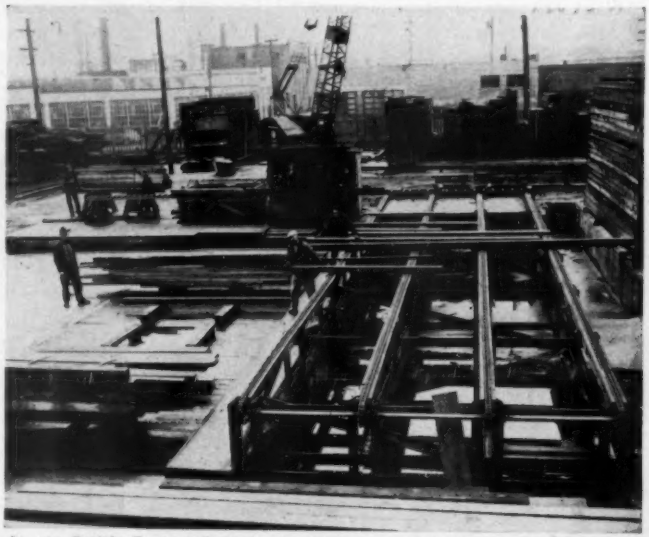
Six men are required for the entire reclaiming operation and the labor costs amounts to $9 per 100 bf. A day's output ranges from 20,000 to 30,000 ft of lumber depending upon the sizes being handled. There is no waste for the 10 per cent lost in trimming is salvaged and sold as fuel. This scrap goes into wooden bottom dump boxes at it leaves the trim saw and is picked up by a small mobile crane for removal to the salvage yard.

Lumber with oil or grease spots is kept for vehicle cargo dunnage. Clean lumber is kept for cargoes such as grain. Relatively little lumber is salvaged from freight cars. The longer material is reclaimed but the shorter boards go to scrap.

Dunnage formerly was destroyed by burning by the Army operated Port of Embarkation and it was not until a speedy and economical method of processing was devised that reclaiming work was undertaken. J. Bach who devised the transfer chain sorting table, for which he was rewarded by the Port, is in charge of the work.

Bach points out that the essential feature of the operation is the arrangement of equipment and manpower within a confined area in such a way that there is no possibility of waste motion or time. A practical aspect is the storing up of lumber for a run of several days so that workmen may become geared to the operation in the interest of efficiency.

Although the salvage yard is situated several blocks from the Port's main shipping terminals, the cost of trucking the salvaged dunnage is not reckoned in the reclaiming overhead. There is no storage space on the docks so of necessity the lumber, either new or reclaimed, would have to be held in a storage yard until needed. For this reason the hauling work is not charged to salvage.



At one Seattle Port of Embarkation lumber is reclaimed at a cost of $9 per 1000 board feet. Lumber arrives in slingloads (upper left background) where nails are removed. It then moves on roller conveyors to the cut-off trim saw where the ends are squared before reaching the sorting table transfer chains

There's Gold in That Thar Trash!

It generally costs money to get rid of trash in any plant . . . However, it is possible to make a profit out of the job by careful study of the methods of disposal and the content of the trash . . . First, a study of the trash will often reveal ways in which the amount can be reduced and thus cut down on waste . . . Methods of collection . . . Methods of moving . . . Methods of disposal . . . Economics of salvage

By R. M. FRANCIS, Plant Engineer

HOW MANY plant engineers have ever had occasion to add up the total cost of trash disposal in their plants? It is probable that more of us know what our *scrap* disposal costs are, because scrap credit is reflected directly in manufacturing costs. Regardless, it's quite interesting to trace the complete course of trash and scrap thru the plant, and to accurately evaluate the handling and disposal costs of each.

Trash Disposal Costs

The word "trash" covers a multitude of sins; some necessary and some preventable. An analysis of ordinary trash would show that dirt, paper, wood, scrap, wire, rags, and empty bottles constitute a large portion of the total. In addition, small product parts, broken tools, old shop equipment, empty containers of all sorts, and many other items, can be found in the scrap from the average plant.

In a study of trash disposal costs, we must put a "price-tag" on each of the following factors: sweeping and vacuum-cleaning; emptying of waste containers; conveyance of scrap to point of final disposition; segregation, or packaging; baling; and scrap credits.

Analyze the Trash

Assuming that we take for granted a high disposal cost, suppose we use the logical approach of analyzing our trash first, in an attempt to reduce all possible sources of the items that eventually go into the trash can. It may sound silly to suggest an actual detailed analysis of typical samples of trash, but this is exactly what is needed—before an intelligent cost-analysis, or cost-reduction, can be made. From such an analysis will come the ideas for attacking the problem at its source.

For the sake of argument, let's assume that we have taken the trouble to carefully analyze a 100-pound typical sample of trash, and found the following items:

Item 1—55 Lb Corrugated stock
Item 2— 6 Lb Miscellaneous paper
Item 3—11 Lb Beverage bottles
Item 4— 3 Lb Dirty rags
Item 5— 5 Lb Scrap metal and wire
Item 6— 1 Lb Metal product parts
Item 7—12 Lb Dirt, non-burnable
Item 8— 7 Lb Scrap wood

100 Lb Total weight

What does this analysis immediately present in the way of suggestions for reduction of trash-disposal costs? Well, it's quite obvious that the first problem is that of reducing the source of the materials involved. Of course, there's some salvage value to most of the items; if it doesn't cost too much to segregate one from the other.

Prevent It, If You Can

Trash prevention can be the subject of a very important project in most any plant. Some companies have regular functions for this work; during the last war we were all conscious of the urgent need for preventing waste. So, there's no question about the logic of trying to prevent trash, rather than to reduce the cost of disposal.

Starting with Item 1, we note that over half of the total trash content is corrugated carton stock, which is currently quite expensive. Segregating these cartons into classes, we find that 90 per cent of them were containers for product parts shipped to the plant by an outside vendor. Here's a wonderful place to start! Contact your materials-handling and packaging engineers, and get them busy on the problem. If your plant isn't large enough to have such experts on the payroll, do the job yourself. All it requires is horse-sense and a fundamental knowledge of packaging. Simply stated, your problem is one of eliminating individual item cartons, and changing to a "palletized-unit-pack."

If you haven't the time to work out the problem yourself, and don't have a specialist in your plant, bring in a representative from your vendor's plant. He'll most certainly be glad to cooperate, because his costs will be reduced also. (One case study proved that 4096 small parts, packed in individual cartons—12 to the case—were successfully packaged into one palletized unit which saved about 95 per cent of all carton stock. All of the 4096 individual cartons were eliminated, plus 340 cases. The new unit-pack consisted of "egg crate" trays—mounted on collapsible pallets—and banded with steel bands to form a cubical load approximately 4 ft on each side. When empty, the pallet and trays were collapsed and returned to the vendor for reuse. The net result was a $20,000 per year saving in packaging cost, *plus* a reduction of $3000 per year in over-all trash-disposal costs.)

Item 2—Miscellaneous Paper—is more difficult to control, but will be discussed later.

Item 3—Beverage Bottles—this is quite a problem in some plants, and no problem at all in other plants. If yours is one of those plants plagued with the empty-bottle problem, you've probably long since realized that there's only one solution; namely, to provide empty cases at convenient locations, and to get your employees to cooperate by placing the bottles in the cases. Various schemes have been devised to attain the control of bottles, but the primary objective is to keep those bottles out of the trash can.

Item 5—Scrap Metal and Wire is, of course, an important part of every scrap-reduction project. However, if the various articles of metal are checked for source, some action can undoubtedly be taken to reduce the waste.

All of the above is intended to convince you that it is all-important to take every possible step to eliminate trash before you start disposing of it. Only a careful analysis will give you the clues as to how to pro-

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Valve Salvage at Pontiac Motors

Some of the air, water and steam valves which have been salvaged by plant engineering department at Pontiac Motors Division, General Motors Corp. Over 1500 valves of all types are repaired and reclaimed each month. This is but one of many such activities which reduces costs for Pontiac by salvaging gloves, leather aprons, brooms and air filter elements. Some of the repair work is done on the premises; some of it is sent out usually on a flat price contract basis either to the original source or to the supplier

ceed. After all eliminations have been made, let's tackle the problem of efficiently disposing of the necessary remaining trash.

Methods of Collection

The conventional methods of sweeping, vacuum-cleaning, and hand pickup, are required in most every plant. True, a central system of vacuum-cleaning saves time, money, and extra handling; however, any form of vacuum-cleaning can only handle dirt and small objects which can be air-borne. Heavy and bulky trash must be physically placed into containers and thence disposed of.

Regular dust-collector systems provide for removal of certain types of product-manufacturing wastes, such as sawdust, metal dust, etc. The design of these systems provides for the collection of the wastes and the conveying to some central point where the material can be subsequently disposed of—in bulk.

Large areas, inside or outside, can be efficiently cleaned with heavy-duty power sweepers. These machines will do an excellent job of cleaning up dirt, papers, and small objects, very quickly. They are self-propelled, and usually provide riding capacity for the operator.

For in-plant collection of trash, two containers should be provided at each location; one for paper only, the other for all trash other than paper. Of course, this scheme will work only if the employees are educated to its benefits—and are sold on the principle. This takes a lot of doing in some plants, and is almost impossible to attain in others, especially if the employees have had bad habits along this line for many years. Incidentally, if you are contemplating a new plant, it is so important that the new employees are carefully and properly instructed in the principles of good-housekeeping and waste-prevention. If they are started properly, it's relatively easy to maintain high standards. If successful in the establishment and operation of the two-container system, your segregation costs are minimized.

If, in the manufacturing processes in your plant, special wastes are generated, they must be handled as specific problems. For instance, the dust and chips involved in the machining of magnesium must be carefully collected and disposed of, as a safety measure. Also, the sludge removed from water-wash paint spray booths should not be mixed with other trash. Such special cases will be evident immediately when the trash analysis is made.

In general, the methods of trash-collection can only be determined after an analysis is made of all scrap generated. In some cases, mechanized collection devices are indicated; however, the best of systems require a certain amount of labor, and that means dollars—spent in a non-productive part of your business.

Methods of Conveyance

Probably the most elemental means of conveying trash is the floor-truck. There are many types, but basically they are all alike: some type of box, mounted on wheels. The trash from the cans is dumped into these trucks, and is then wheeled to some point for further disposition. Floor-trucks are very practical for multi-story buildings because they are completely maneuverable in aisles and on elevators. These vehicles can be pushed by hand or towed by industrial truck.

Also, in multi-story buildings, trash from the floor cans can be efficiently conveyed to the ground floor in trash-chutes. These should be metal, of course; should be straight and cylindrical if possible; should be centrally located; and should be provided with sprinkler protection at the top. The bottom end should dump directly into a trash-trailer; or better yet, into the incinerator area. The top of each chute should have screened openings to the air; to prevent up-drafts from blowing dirt back into the building when doors are opened. The bottom of the chute should be equipped with a gate, for use in regulating the trash flow out of the chute.

If the trash is to be conveyed to some point away from the building, trash trucks or trailers must be used. Usually it is most economical to collect the trash from various trash-chutes with one truck, making the collections as often as required. This scheme employs the chute as a storage bin, which requires regular routine collections. If the trash volume is great, trailers will be required at each chute. These can be hauled away by truck-tractor. If trailers are used, provision should be made for automatic dumping at the incinerator or other disposition point. Also, these trailers should be equipped with closed tops, to prevent scrap paper and light dusts from being distributed over the landscape.

In processes generating a large volume of waste, conveyors are indicated; especially if the waste is uniform in nature. Such materials are generally classed as by-products, and should be treated as part of the manufacturing process, and not as trash.

Methods of Disposal

As in trash-prevention, a careful study is required to best determine the methods of disposal. In a simple operation, an incinerator usually receives all trash, burns the inflammables, and passes the balance into the ash pit. In normal times, this operation can often prove to be most economical; however, in a high paper market, segregation is generally indicated. Regardless, in every plant, some incinerator operation is required to dispose of certain paper, rags, wood, etc.

If your trash analysis shows a lot of scrap paper which is easily segregated, a further study should be made of a paper-baling setup. Balers are not expensive, compared with other plant equipment, and will usually pay big dividends. Certain

papers in industrial plants, must be destroyed because of their confidential nature; payroll, sales, and personnel records and correspondence, are typical. In this case, there are two methods of disposal: 1. burning, or 2. shredding, to destroy legibility but save the paper. Often times, shredded paper can be used as a packing material, with the resultant cost-savings. In any case, there is always a good market for shredded paper, and shredding should be investigated in all cases where confidential papers must be destroyed.

Again, assuming that all possible recovery should be made from plant trash, certain basic things must be done. First, the trash must be segregated, if not already in such condition. As mentioned earlier, the business of segregating trash usually involves considerable hand labor, so don't overlook this factor when planning trash disposal. One piece of equipment used to do part of the job automatically is a metal separator. This is simply a magnetic drum which acts as one pulley on a simple endless belt conveyor. The trash is placed on one end of a short belt, and dumped at the other end. All ferrous metal scrap will adhere to the belt, on the magnetic drum end, and be carried around and under the drum, so that it can be discharged separately from the rest of the scrap. Other metals can be separated by gravity-shaker tables.

If the plant trash includes any sizable quantity of wire or sheet metal, a metal scrap-baler is indicated. This usually comes under the heading of "scrap," instead of "trash," and will be discussed later.

As mentioned earlier, certain definite factors must be evaluated, and complete data must be collected, before any decisions can be made on the most efficient methods of trash disposal.

Economics of Trash Salvage

First, a good trash-prevention campaign might well reduce the trash *volume* and *type* to such a degree that the one best disposal method is evident immediately. If not, the following steps must be taken to complete the study:

1—Determine the amount, and value, of all trash which can be reclaimed.

2—Determine the methods of segregating the different types of trash materials.

3—Evaluate the cost of all equipment used in segregating scrap.

4—Estimate the labor costs involved in segregating, and handling, reclaimed materials.

5—Investigate market conditions, and determine scrap value of segregated trash.

6—From the data gathered in the above steps, make an analysis of Cost vs Return, applying all fixed charges on equipment, plus operating labor. The results will chart your future course on trash salvage.

If the paper market is high, some junk dealers will take all trash, segregate it, and allow a fixed price per pound for all types. This might prove to be the most economical system of all; it depends on the trash analysis.

Scrap Salvage and Disposal

There is a vast difference, generally, between the trash and the scrap generated in an industrial plant. We have discussed trash previously, and will now take a look at scrap salvage—and disposal.

First, it is assumed that the plant scrap is segregated. If not, there is a basic problem of segregation, right at the point of origin. In woodworking plants and sawmills, for instance, the two basic items of scrap are sawdust and wood scrap. Usually, the sawdust is collected with a plant-wide system of dust-collectors, while the wood scrap is collected in shop trucks or on conveyors.

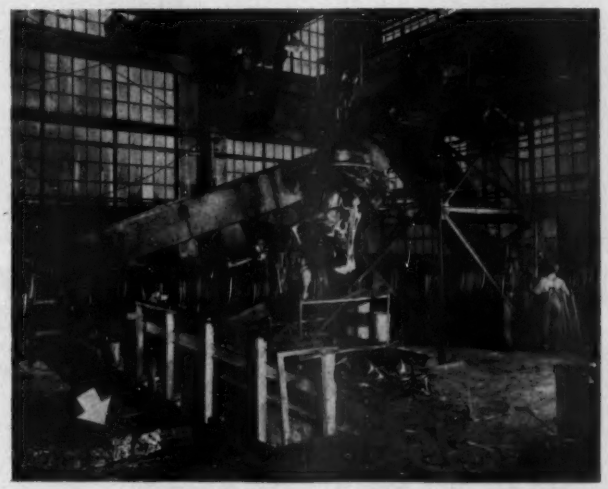
Next, concerning plant scrap, there is usually a definite "end-use." Referring again to the woodworking plant, the scrap is probably scheduled for some type of fuel. In some cases, the wood flour is processed into plastic-wood to be used as filler compound. Sawdust is frequently used for several other applications; however, the primary end-use of the wood waste is for boiler fuel. So—the collector system places the sawdust right into the boiler house. Since little process steam is required in woodworking plants, there is usually an over-supply of sawdust fuel during the summer months when heating is not required. This usually results in quite a headache for most plants, consequently the huge sawdust piles nearby. A process of making "briquettes" was developed some years ago, which permits surplus waste materials, like sawdust and coke dust, to be satisfactorily sold for public consumption. Wood scrap usually has to be ground into smaller pieces before it can be burned satisfactorily; this is done by a woodhog.

Scrap from wire mills is all reclaimed because of the value of the material. Also, in plants generating a lot of sheet metal scrap, the problem is pretty well "cut and dried." In both cases, the scrap is collected, segregated by material, baled, and sent to plants which reclaim such metals.

Plants which have large quantities of metal chips to dispose of have disposal equipment which reclaims the metal and the oil used in machining operations. These are "bread and butter" functions, and have been worked out for many years.

In the cases cited above, one function is common to all; namely, the handling and disposition of all scrap to a definite end-use. Applying the most efficient end-use to industrial plant scrap is an age-old problem, and is one upon which we will not dwell at this time. Needless to say, each plant has its own peculiar problems which require individual and specialized study.

Scrap Baling at Pontiac is Flexible



Conveyors carry the baled sheet metal shearings (arrow) direct to cars for shipment. Scrap is delivered to the electromagnet by truck or by the conveyor in the upper right hand corner into the gravity chute and thence to the balers. One baler is at the extreme right, the other is just out of the picture at the left. This operation is carried on at Pontiac Motors Div.

Salvage, Scrap, Economy, Linked at Mansfield Plant of Westinghouse

Economy of operation, the variable factor in the cost of any product, is controlled closely at this huge appliance plant . . . Everything is saved, if it can be saved at a profit, from test toast to broken plastics . . . Parts are sold back to the company, on a bookkeeping basis . . . Rags, gloves, coveralls are laundered, paint is reclaimed, refined metals are rescued, containers are returned to suppliers, paper is baled

ONE SALVAGE program which has proved itself over a span of 16 years, in war and peace, is in operation at the Appliance Division plant of Westinghouse Electric Corp., Mansfield, Ohio. Everything from paint to wood is salvaged; everything from waste paper to toast is scrapped. In 1950 salvage and scrap value amounted to $1,424,268.

Heart of the salvage program is a portion of one floor in a building on the outer perimeter of the plant property. Here are located cardboard slitters, paper balers, a plastics grinder, woodworking shop for the reclamation of worn out bins, boxes and tubs used on the production line and for the redesign of crates from incoming shipments.

Also found here are punch presses used in the reprocessing of what would normally be scrap metal. A miniature laundry reclaims cleaning rags (in 1950 nearly 35,000 lb) and also does a renovation job on such diverse items as emery discs, goggles, rubber boots, aprons, gloves, coveralls and mops.

The major item of reclaimed material is paint. Last year more than 160,000 gal of paint were recovered from the water wash spray booths. Collected into drums the paint is conveyed by truck to the paint mixing room. Here it is tinted (when necessary), mixed with the proper solvent, sampled, identified and stored. If the sample tests okay, the paint is available for re-use at the

Fig. 1. Top: This hammer mill does a fast and efficient job of grinding up salvaged plastic parts. The department classifies plastics in seven different groups. Fig. 2. Center: Magnetic separator helps keep up the value of steel scrap salvage, separating ferrous from non-ferrous metals. Fig. 3. Bottom: Here is carried on the reclamation of spools, reels, drums, other containers

ratio of 1 to 3 with new paint. Last year, the value of recovered paint was $430,215.

An example of clever utilization of waste appears in the salvage department's manufacture of protective shipping pads. Paper cartons which, for various reasons, cannot be returned to the suppliers, are trimmed on a slitting machine in order to remove staples which might scratch the surfaces of appliances. The trimmings are sent on to the baler and the clean strips are scored, wrapped with new paper and formed, on a home made die, into protective pads. This process has resulted in the production of 80,000 pads per month.

Reclaimed cartons, cardboard and paper are not huge dollar volume items in comparison to a couple of the other categories. It is a respectable figure, nevertheless, last year totalling $39,740 worth to the company. Of this total, $17,433 represented the savings accruing to Westinghouse through the return of cartons to suppliers. The value of the pads manufactured as described above was placed on the books in combination with the number of cartons placed in use in the plant. This amount came to $5,836.

The remainder of the $39,000 total is comprised largely of baled paper and cardboard, and burlap. Most of the paper is segregated into paper book stock, Kraft, newspaper, and cardboard before baling. The baler

Fig. 4. The slitter operation in the salvage department prepares waste corrugated board for the manufacture of shipping pads used at the Mansfield plant

Fig. 5. Right: These two operators are employed in forming the strips of corrugated board, prepared as above, into pads used in shipping of appliances

Fig. 6. Below: A hay baler, right from the farm, has been found to be the most effective tool for paper baling. Two such machines are used to bale paper in amount of 90 tons per month

General tabulation of scrap and salvage figures for the year 1950 at Mansfield

Materials Placed in Use	Quantity	Company Savings	Net Savings
Paint	162,233 gal	$430,215.08	$64,042.44
Solvents, Oil, Thinners	37,451 gal	20,764.87	1,082.62
Laundry Activities	34,287 lb	10,084.77	3,663.04
a. Cleaning Rags			
b. Emery Discs, Goggles, Rubber Boots, Aprons, Gloves, Coveralls, Mops			
Sheet Metal Jobs—			
Sheared and Blanked	4,712,577 lb		208,849.90
Lumber	56,408 bd ft		2,947.24
Paper and Cardboard			39,740.22
Refined Metals			14,323.38
Employee Cash Sales			3,768.69
Scrap Sold (Major Metals)			704,286.87
Hardware, Hand Tools, Other Shop Supplies			541.03
Labor Repairing Crates			11,653.03
Drills Sharpened			20.16
Misc. Sales to Other Plants and Companies			49,681.14
Not Listed			1,497.73

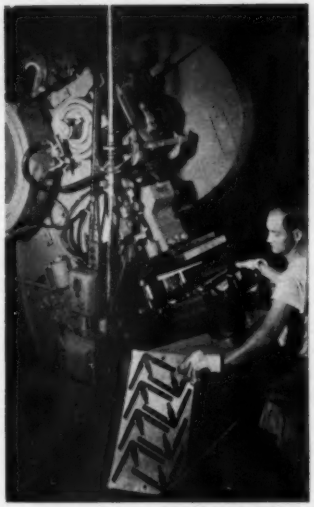


Fig. 9. This punch press, one of four in the Salvage Department, along with four shears, is used to reclaim salvaged metal. The department averages about 150 tons of reclaimed steel per month

which has proved to be most useful in the paper baling operation, according to Al Fankhauser, supervisor in charge of the salvage section, is an old hay baler which was resurrected from some forgotten place in the dim past.

Containers returned to the suppliers encompass about every type and size. Listed among these are: drums, reels, spools, carboys, cylinders, motor skids, Micarta panel crates, Micarta skids, fan boxes. The total billed value of these in 1950 reached the astounding figure of $218,900. This amount, however, was not credited to the Salvage Savings.

A job shop operation is also conducted by Salvage. Sheet metal scrap, copper, steel, aluminum, etc., of all gauges is segregated and kept separated in back of the punch press section. When sufficient quantities of any one type and size have been accumulated, Salvage obtains a die for some current product and blanks as many pieces as the material will allow. These parts are then re-sold to the company. In 1950, 1495 jobs were sheared and blanked for a total of 4,712,577 lb worth $208,849.

One seemingly minor operation of the Salvage Department is the plastics reclamation job. No figures were available on this but it is understood that the first shipment of reclaimed plastic paid for the equipment and the operator's time. A display board showing where and what types of plastics are used in the company's products was first prepared for guidance of the operator. Next, a hammer mill for reducing the plastic to a marketable condition was then installed . . . and the plastics reclamation job was functioning.

Nickel is, of course, an extremely scarce metal. The Salvage Department, after some close figuring discovered that it could have old heating elements from electric stoves shipped in from dealers all over the country and prepare them for scrap at an average cost of 20 cents each. The market value of the units was 30 cents, giving Salvage a 10 cent net profit on each unit.

One of the most unusual bits of scrap in the entire operation is the "old toast" department. Each and every toaster manufactured at the Appliance Division plant must be tested with 6 slices of bread—two light, two medium and two dark. The resulting toast is thrown into cardboard drums, carted to the shipping platform in Salvage and is sold to a local hog raiser. At Mansfield they use the hog's squeal before it is sounded.

Fig. 7. Above: Crate and box repair is carried on in this carpenter shop section

Fig. 8. Right: In this laundry, all wiping rags, mops, coveralls and other items are washed, spun partially dry, and dried in commercial-type driers

Disaster Salvage with MH Equipment

Materials handling machines, buried many feet under Kansas City flood waters, were retrieved and put back into service through cooperation of Clark Equipment Co. with local representative and men from other cities . . . Trucks were returned to service at rate of three per day with 17 servicemen working two shifts . . . Emergency shipment of parts to help augment local stocks . . . Ingenious design of scoops and other attachments helped in digging out and cleaning up

In the shop of Kansas City representative is a group of fork-lift trucks and a hand-platform truck in various stages of servicing. Crews worked 7:30 am to 2:30 am next day

One of the first steps in the rehabilitation process after disassembly is to steam clean parts of the trucks. Mechanic is shown cleaning the uprights to remove dirt, grease and rust

Spraying inner wheel assembly and brake band of flood damaged fork-lift truck with naphtha to flush out foreign matter. Pyrene extinguisher fluid is sprayed on to remove naphtha

Reassembling flood-damaged fork-lift truck engine after disassembly and cleaning. The test stand holding engine is used for running, testing serviced engines before reinstalling them

Scoop attachment on fork truck is used to load highway truck with water-soaked debris at Owens-Corning Fiberglas. Trucks were used to separte dry and wet insulation packages

Moving a pallet-load of flood-damaged paper container blanks at Sealright Company. Of six fork trucks damaged at Sealright all but two had been salvaged when photo was taken

Steel shelving, water-soaked and mud-covered, was removed from Civil Aeronautics Authority hangar at Fairfax Airport by fork truck and the mud and debris were flushed from it

Ingenious operators devised many attachments for the clean-up job. Here, at the warehouse of Kansas Service Grocers, damaged stock is removed by truck with plow attachment

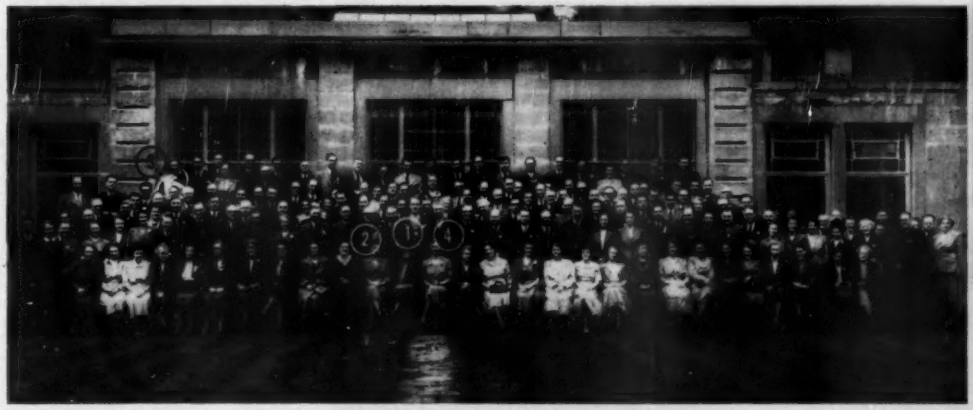
No. This scene wasn't the result of a bargain sale. It is a heap of flood-damaged stock at Kansas Service Grocers being pushed outdoors by truck for later removal and disposal

Operator using fork-lift truck to separate and shift palletized loads of flood-damaged paper truck on slippery floor of Sealright Company. Most machines came through ordeal well

Camera Shots of Plant Engineers Club Activities

DAYTON: Third meeting of the Plant Engineers Club of Dayton organized in March. A Policy Committee (Merriss, Hahn and Wright) nominated a slate of two candidates for each office. Officers elected at this meeting were: president, Henry E. Gorney; vice-president, Charles Wright; and secretary-treasurer, F. W. Hardin. Over the summer the committee will formulate a constitution and bylaws and then continue in force to screen new applicants for membership. In the photograph, from left to right, are: 1, F. W. Hardin, Hewitt Soap Co.; 2, Vernon Kahl, Moraine Products Div. of GMC; 3, Arthur Ferguson, Morris Bean & Co.; 4, John H. Harrington, Univis Lens Co.; 5, P. W. McNealy, Delco Products Div. of GMC; 6, M. B. Proctor, Leland Electric Co.; 7, B. L. Merriss, Oxford-Miami Paper Co.; 8, Wm. H. Hahn, McCall Corp.; 9, Henry E. Gorney, Standard Register Co.; 10, Ernest C. Early, Crowell-Collier Publishing Co.; 11, Milton Rosenthaler, The Sucher Packing Co.; 12, Charles Wright, Delco Products Div. of GMC; and 13, G. E. Miller, Frigidaire Div. of General Motors. The club meets the first Friday of each month from September to May inclusive

BOSTON: Annual outing of the Plant Engineers' Club of Boston was held June 21 at United Shoe Machinery Co. Athletic Club in Beverly, Mass. Besides the election of officers, the group, consisting of 97 members and guests, played golf, tennis, cards, they bowled or "just sat on the porch with tall, cool ones telling tall tales." Those who were able to tear themselves away from the Lobster Tomali appeared in the photo. Ernest Kimball, (No. 1) Gillette Safety Razor Co., was retiring president; Leo J. Monty, (No. 2) Artisan Metal Products, retiring vice president, was elected president; and Edward W. Benner, American Sugar Refining Co., (not in photo) was elected vice president. Byron A. Engelbach, New England Confectionery (No. 3) retiring secretary-treasurer, was re-elected to the post. A steak dinner topped off the day's activities



ENGLAND: The Fourth Annual Conference of the Institution of Incorporated Plant Engineers held at Buxton in May and representative of the profession in 26 countries. Identified in the photograph are: 1, the new president, D. Lacy-Hulbert, Chesterfield Tube Co., Ltd.; 2, the retiring president, E. G. Phillips, consulting engineer; 3, past president, L. G. Northcroft, Spirax Manufacturing Co., Ltd., and 4, Richard H. Morris, Editor of Plant Engineering, Chicago

"Caterpillar Program" for Additive Oil Specs

How the company delegates lubrication responsibility . . . Systematic investigation of additive-type oils: laboratory bench tests, pilot machine tests, and full-scale plant tests . . . Oils tested singly and mixed with other oils . . . Precautions to observe in writing specifications

AS WITH ANY PRODUCT newly developed and untested in actual field service, additive-type hydraulic oils trod a slightly rocky path to acceptance. Failure of just one brand-name oil was sufficient to put the curse on all brands, and the premium price which such oils commanded did little to encourage their early use.

Thus, it was quite natural that users became wary of purchasing, at this significantly higher figure, a product which might fail prematurely. Furthermore, in addition to the higher price paid for these oils, even greater costs might be incurred by unwarranted machine down-time and by corrosion of pistons, cylinders, valves and other parts of the hydraulic system.

At Caterpillar Tractor Co., just before World War II, hydraulic oils were purchased on the basis of specifications of physical properties and a modified oxidation test. Hydraulic oil purchased under this type of specification procedure was of the straight mineral oil type. Although performance was satisfactory under average conditions, provided fairly frequent oil change periods were maintained, under certain conditions "wire drawing" was experienced. Where higher temperatures were encountered trouble was had with varnish deposits, sticky valves and sluggish systems.

Four-Department Job

The lubrication of plant equipment at Caterpillar's Peoria plant is the province of four departments:

Lubricants are requisitioned, stored and delivered to points of use by the General Stores Department.

Application, which includes the supervision of personnel, selection of methods of application and selection of equipment for applying it, is handled by the General Maintenance Department.

The Metallurgical Department specifies the lubricants to be used and makes the rules which govern how they are to be used.

Finally, the Machine Repair Division takes care of those cases where the functions of the Metallurgical and Maintenance Departments can not be properly extended.

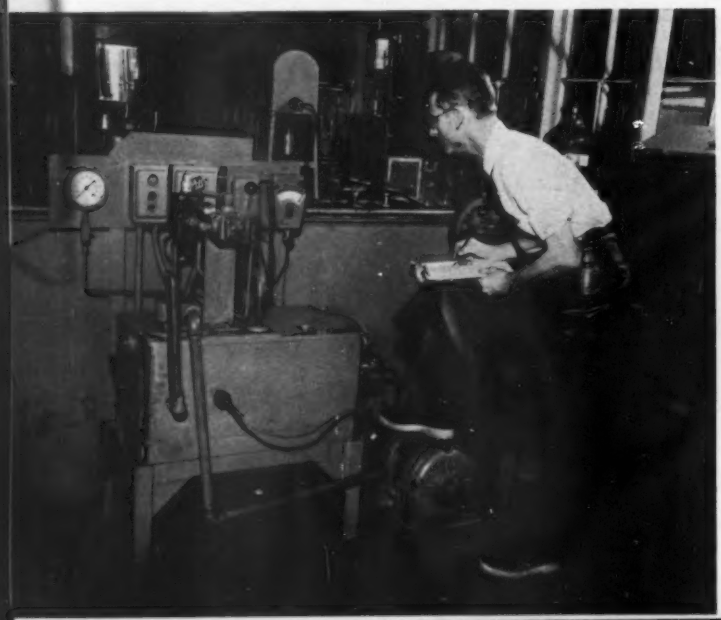
This system of checks and balances stimulates continued investigation of more satisfactory methods of performing the lubrication job in all its phases. A good example of this is the process by which the present specification for heavy-duty additive-type hydraulic oil was arrived at.

Additives Enter Field

In 1945 a number of oils of the additive type were marketed. Some of the manufacturers claimed that their oils would overcome the difficulties which had previously plagued their users. Several such claims were investigated with indifferent results but, with a belief based on wartime experience, that much progress in the field had been made, the Metallurgical Department plunged into a systematic investigation to determine which of the additive-type hydraulic oils would best serve the Company's needs. Accordingly, samples of seventeen different hydraulic oils of this type were secured and were included in the test program. The program was divided into three phases.

1. Laboratory Bench Tests.

Phase 1 involved subjecting the oils to laboratory bench tests under ASTM Test D943-47T, "Oxidation Characteristics of Inhibited Steam-Turbine Oils." The modification of that same test, according to Dr. K. Von Fuchs, also was used. The comparative standard used for the program of tests was a selected sample of the specification type straight mineral oil. Six of the seventeen oils survived the first phase, thus indicating superiority to the straight mineral oil in both oxidation resistance and rust preventive properties.



Thomas Phillips of Caterpillar Tractor Co.'s metallurgy laboratory, taking a reading from the oil testing apparatus

I. This specification includes all of PX 99000 and is further qualified as follows:

II. APPLICATION: This is intended for shop use in hydraulic units where high temperature oxidation and corrosion resistance are of major importance.

III. REQUIREMENTS:

(A) Viscosity (ASTM Designation 88-38) at 130 F. .....140-145 S.U.S.
(B) Viscosity index, minimum 95
(C) Flash point (ASTM Designation 92-33), minimum .....400 F.
(D) Pour point (ASTM Designation 97-39), maximum .....25 F.
(E) Copper strip corrosion (Federal spec. 530.31) .....Negative
(F) Rust preventing characteristics (ASTM Designation D665-47T), minimum...48 hrs.
(G) Oxidation characteristics (Modified ASTM Desig. D493-47T)...Neut. no. shall not exceed 2.0 before 1000 hr.
(H) Emulsion (Federal spec. 320.12) complete separation from distilled water @ 130 F. in 30 min.
(I) Oil shall be free of all foreign matter of solid nature such as lint, dirt, etc.

IV. IDENTIFICATION: All containers used for this oil shall be identified by the vendor with PX 99030 on both the side and top of the drum. Identification on the side of the drum shall be centered.

V. APPROVED PRODUCTS:

Caterpillar's specification sheet for medium hydraulic oil. A similar form is followed in specifying other grades of oil

2. Pilot Machine Test.

Phase 2 involved subjecting the surviving six oils to tests against the standard in a laboratory pilot testing machine. The equipment used for the test is shown in the accompanying photo.

It put the oil sample through an accelerated oxidation test by subjecting it to temperatures of 250 F in an intimate mixture of air. In addition, it also brought into play some of the other factors present in the hydraulic systems of actual machine tools.

Two modifications of this test were employed. One involved recirculation of the oil through the hydraulic pump with temperature regulated by a thermostatically-controlled immersion heater in the reservoir. In the second modification, high temperature was generated by means of 950 psi pressure and the temperature was controlled by means of thermostatically-controlled cooling coils immersed in the reservoir.

Three of the six oils survived this test, all of them giving an indicated "life value" from eight to thirteen times greater than that of the specified straight mineral type oil.

3. Full-Scale Plant Test.

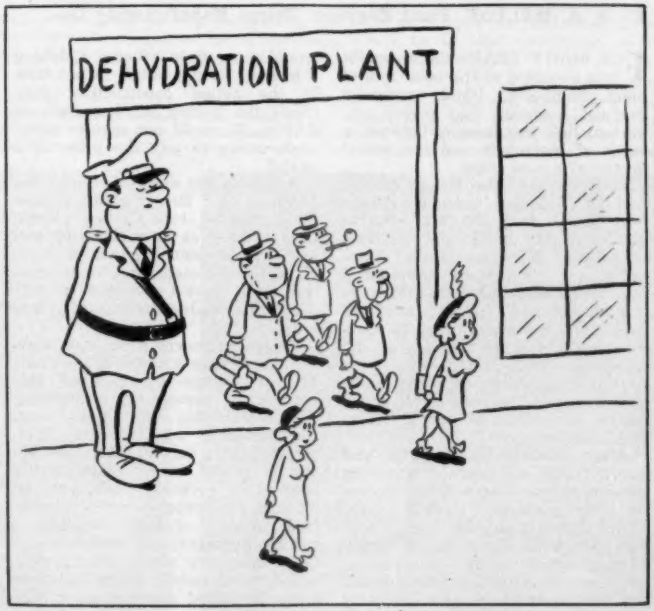
The three oils which passed phase number two of the test program were then subjected to the third phase; a full-scale plant test. Hydraulically-operated machine tools in the plant departments were drained, cleaned and filled with test oil. Detailed consideration was given in order to select departments having similar equipment and similar operations so that results could safely be compared. The oils were run for a period of eighteen months under average factory conditions with samples being examined periodically for signs of oxidation breakdown, rust formation, depletion, and other signs of deterioration.

At the end of the test period it was concluded that any one of the three oils would give performance life great enough to justify the significantly higher cost and, at the same time, eliminate most of the difficulties formerly experienced because of the deficiencies of the hydraulic oils.

Laboratory bench tests, nevertheless, were repeated on all possible combinations of the three oils. This was an added precaution against running into unforeseen difficulties should purchasing bottlenecks require the mixing of two or more oils. In all cases mixtures performed as well or better than the unmixed oils.

As a result of these findings, new specifications were written for each of the viscosity grades required and all hydraulically-operated machines that were in good condition were changed over to the additive-type oil. Up to the present time, the only oil that has had to be changed is that which has become contaminated with foreign materials, or that which was being used in machines which required repairs necessitating draining of the hydraulic reservoir. Periodic spot examinations of machines that have run as long as thirty months have revealed no marked deterioration of the hydraulic oils.

Oil specifications should be as simple and straightforward as possible, embodying only what is essential. Specifications shown in accompanying table are of that type.



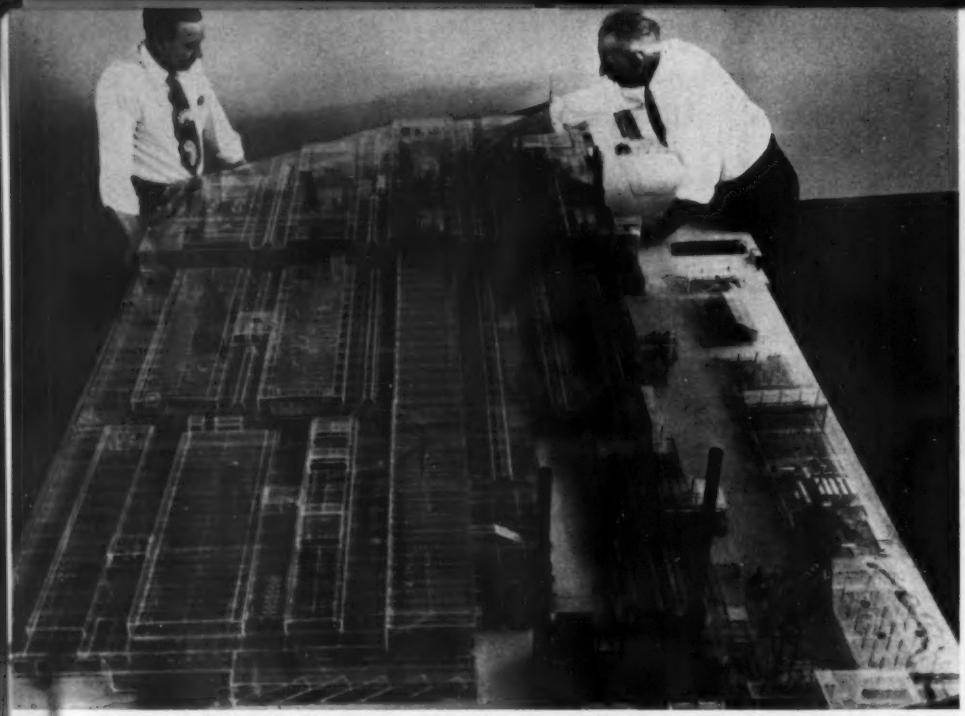


Fig. 1. Completed model of plant offers many advantages: traffic jams at exits can be visualized, the problems of re-arranging machinery are lessened considerably and location of toilet facilities is readily apparent

For Plant Layout Build a Model — Then, Build the Plant

By R. A. MELTON, Plant Engineer, Briggs Manufacturing Co.

FOR MANY YEARS the blueprint was accepted as the basic tool of plant engineers. Plant engineers realized, however, that a very important link was missing between a stack of blueprints and the actual layout of a new plant.

Early in 1950, the Briggs Manufacturing Co., producer of automobile bodies, took the first step to eliminate this blind spot in their operations. Being aware that blueprints are often more complicated than reasonable, the plant engineering department frankly admitted that it was not always easy to visualize an object by looking at its blueprint. They found this to be especially true when an entirely new idea was being introduced. In other words, there was too much left to the imagination.

After considerable research and investigation, the plant engineering department came up with an answer to their problem — models. They found that industry for many years has considered the model a luxury of questionable value. However, an error or miscalculation which would not be apparent on the blueprint would show up in a model. Catching a mistake at this stage, rather than in the actual construction, may mean the saving of thousands of dollars. It would not require many such errors to pay the price of a model.

Although the model for only one of the several Briggs plants is thus far completed (the Connor plant), its usefulness as an engineering tool has already been evident. A complete, three-dimensional, visual record of the exact condition of this plant is available for instant reference.

Briggs engineers have been constantly surprised at the great number of unexpected uses of this method of presenting engineering data. To develop a sprinkler system, for instance, main water lines, steam pipes, valves, etc., are instantly placed in reference to the area to be covered; traffic jams at exits in emergencies can be visualized; location of toilet facilities is readily apparent; and the problems of re-arranging machinery are lessened considerably. Many instances have developed where a short session over the model has brought quick agreement between production, planning and engineering groups.

One-quarter inch to the foot has been almost universal in building models of this type. At Briggs, however, this scale would require such a large area as to be prohibitive. With a scale of ⅛ in. to the foot, the space is only half of that required by the larger scale.

Although the models are not intended for display purposes, they are set up on open-top tables so that the various elements may be underlighted, if required. Each building is a complete unit or a group of units. Walls are made of clear plastic (of a thickness in proportion to that of the actual wall) to exact outside dimensions. The use of plastic has been found very satisfactory. It is easily worked, can be cut, shaped, drilled or tapped and at this scale is stiff and strong. Expansion is troublesome, but this has been overcome by building the models in the same air-conditioned atmosphere as the display room.

Walls and the lower floor are

Fig. 2. In this group of patterns a tractor truck can be seen in the foreground. Under the tweezers is an end piece for a floor conveyor. In front of the man's fingers is a motor. For convenience in locating, the patterns are kept in molds

Fig. 3. All roofs, of course, are portable. The supporting trusses are cut to the outside dimensions, which is the line engineers are interested in; namely, the clearance distance. Here, also, problems in ventilation and lighting are solved

screwed together; windows are scribed and openings cut. Doors, by the way, are carefully kept to true dimension so that equipment models can be moved through them to determine clearance when moving of actual machines takes place. After the walls are assembled on the table and the columns set up, each floor with its columns is dropped in place. Great care is taken in construction to duplicate exact dimensions from the surface of one floor to the surface of the floor above, and in the distance from a floor to the under side of the beams, so that clearances to machines may be scaled to these exact dimensions.

A major item of machinery is the press, and the company owns several thousand of them. To avoid the unreasonable task of making patterns for each one while still fulfilling the requirements of the model, type patterns are made in several different sizes. Patterns are made of brass with just sufficient detail to clearly show the type of machine. From these patterns, a rubber-like negative is produced with a cold pouring compound, and then the parts are cast in low-melting-point alloy or in plastic.

It is noteworthy, in the pattern process, that no special equipment is needed, but to keep within budget bounds, good judgment is required by the pattern maker to show enough detail to represent the equipment accurately but still not spend too much time on unnecessary work.

Briggs' Plant Engineering department believes that models are here to stay, and work is now in progress on the model for the company's largest factory, the Mack plant. It is an ambitious undertaking and will be at least two years in the making.

Fig. 4. The complete floor is placed upside down on the bench while locating an overhead conveyor. When inverted and dropped into the shell of the building, the conveyor will be in proper relation to all the units already installed

Fig. 5. At the front corner of the first floor you will see men working at desks. Note how location of doors and placement of equipment can be studied. Position of elevator, stairways and routing to various machines is apparent

How You Can Make Maintenance a Production Tool

The Productive Maintenance plan is an aid to plant and maintenance engineers in setting up a program of planned outages of machines by use of proper tools, men, renewal parts and routine checks of equipment . . . A kit, as shown at the right, is being made available, free, to responsible plant and maintenance engineers

WITH the need becoming greater every day, the nation's industries must employ every possible means to create extra production. One of these means is the establishment of an effective maintenance program to keep equipment performing as it was designed to perform—and, in effect, as it has seldom performed before. Management has in many cases paid lip service to the importance of the job being done by the maintenance man in helping to keep equipment in good working order. But too often the job of maintenance is looked upon as a necessary evil—something to be done only when the occasion arises.

This negative attitude has failed to recognize in maintenance its positive productive potential. For, properly handled, maintenance can be a constructive factor in increasing productive output. Looked at in this way, maintenance takes on new significance, as an answer to the nation's industrial mobilization needs. More than routine preventive maintenance, it becomes, truly, *productive* maintenance, capable of creating added output without additional machines.

Believing that productive maintenance offers management a new tool for extending production capacity beyond existing limits, not just keeping those limits as they stand, the General Electric Company has developed a Productive Maintenance program that can be applied to virtually every type of industry in the country. This program calling for a thorough and systematized approach to the whole idea of maintenance as a positive rather than a negative force, has the inherent ability to help meet the nation's needs for full industrial mobilization.

An effective Productive Maintenance Program consists of an *adequate staff* of trained maintenance men, armed with the *tools* needed to perform properly the functions of *regular, routine checks* of operating equipment, and *planned outage* of this equipment at regular scheduled intervals. Rebuilding and modernizing machines during time of planned outage is done readily with parts from *an adequate stock of mechanical and electrical spare parts.*

Here is the heart of the Productive Maintenance idea—to overcome as far as possible unscheduled breakdowns of equipment causing delays in production, often when they are least expected or can least be tolerated. By providing for a system of outages, planned in advance for the time when the machines can be taken out of service for the shortest possible time, the stoppage will least affect total output and other operating units in the plant.

Serious consequences can result from unplanned shutdowns, not the least of which is the cost of labor involved. To gain speed in repairing the broken machine, maintenance crews must often work overtime at overtime pay. And they are frequently hampered in their work by shortages of materials and replacement parts both of which serve to prolong the delay and lower output.

The planned outage is designed to take the machine briefly out of service for a thorough, time-saving and production-saving repair job before it reaches the point where it might break down of its own accord. To do this effectively, a complete, systematic survey is first conducted of the plant and how it operates, of the equipment, and the role of each machine in relation to the others.

Broad in scope, the survey thus analyzes, first of all, the entire operation of the plant. It then determines which equipment is the most critical, which carries the heaviest loads.

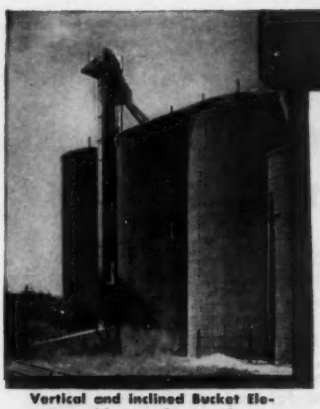
Next, it goes on to list machines and units in the order of their vulnerability, noting the condition of each, its age, state of repair, severity of duty, and similar factors that will enter into determining the desirability of additional repair and the kind of maintenance required.

On the basis of this survey, recommendations can be made for a sound, over-all planned-outage program, and the means can be devised for handling it with a minimum of interruptions to the normal production schedule.

The need for increased production throughout industry is great—and setting up a far-reaching Productive Maintenance program to achieve that added output should not wait. Recognizing this, the General Electric Company has taken active steps to help maintenance men make management aware of the true value of Productive Maintenance. It provides maintenance men with a kit of tools providing the facts and guidance they need to carry out their own productive maintenance program and to convince their management of its necessity for industrial mobilization.

HOW TO GET A KIT

If you are an engineer responsible for maintenance work in your plant you can get the kit shown above by writing "PM KIT" on one of the postage-paid cards in this issue, and mailing it.



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CONVEYING
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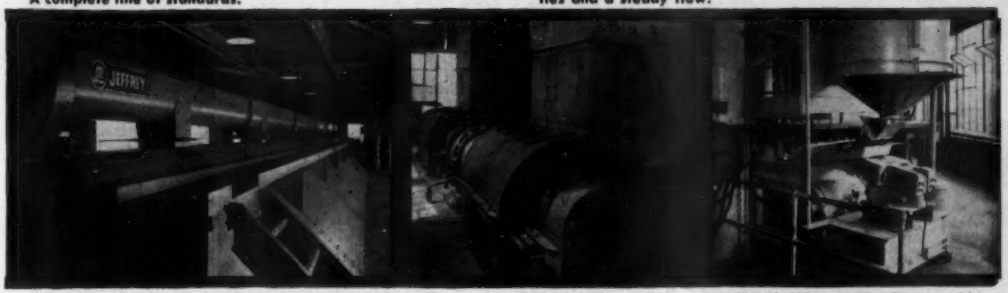
Vertical and inclined Bucket Elevators with spaced or continuous buckets mounted on chain or belt. A complete line of standards.

Belt Conveyors for handling a wide variety of loose, bulk material. Roller or ball bearing troughing (or flat) and return idlers for belt widths from 14" to 60". Large capacities and a steady flow.



Spiral Conveyors will handle many kinds of material with clean, dustless operation. No return strand. Standard types — also many special designs and applications. Interchangeable with other makes — built to industrial standards.

A complete line of Crushers, Pulverizers and Shredders for reducing most any kind of material to desired fineness.

Electric Vibrating Feeders provide absolute control over feeding operations. Open or closed pan, or tubular decks. Capacities from a few ounces up to many tons per hour.

Car Pullers for spotting from one to six cars. Two sizes.

Rotary Bin Check Valves —insure a constant, uninterrupted flow of fine flooding material to vibrating Feeders or WAYTROLS. Also Bin Level Indicators.

Rotary-type Feeder for feeding finely pulverized material. Also Spiral, Apron, Belt, Plate and electric-vibrating type Feeders.

Low Head Barrel Packer for economy in packing operations. Reduces size of containers, increases capacity and cuts shipping costs. Also supplied with deck to provide conveying action during packing operations.

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UNIT HEATERS— Their Effective Use, Control and Installation

Types of unit heaters and what each will do . . . Principles of space heating with unit heaters and how to make most effective use of them . . . Brief description of types of controls for use with unit heater systems . . . Installation procedures and details . . . Types of systems . . . Effects of increase or decrease in rate of air flow . . . Determining capacity of fan in relation to inlet air temperature and height of suspension . . . Manufacturers' recommendations mean what they say, follow them for best results on any job

Fig. 1. Vertical type industrial unit heater frees space on floor for more profitable use; it does not interfere with overhead equipment, material handling The various types of unit heaters, combined with different heating systems and methods of installation make this a flexible method for most plant heating

UNIT HEATERS have been giving satisfactory and dependable service for many years in many fields. Due to the fact that they have large heating capacities concentrated in a small space, coupled with the air moving feature, they are enabled to heat large areas at extremely high speed.

Unit heaters are generally classified as the propeller fan type unit heater and the centrifugal fan type unit heater. Either type may be designed to blow the air horizontally or vertically.

Horizontal discharge propeller type unit heaters are suspended from the ceiling or mounted on a wall. The centrifugal type is a high capacity unit with either horizontal or vertical discharge and may be mounted anywhere.

Vertical or downblast discharge unit heaters are designed to be suspended from ceilings only. This type is especially advantageous for use in buildings with high ceilings. Warm air is forced down, and out, to cover wide areas.

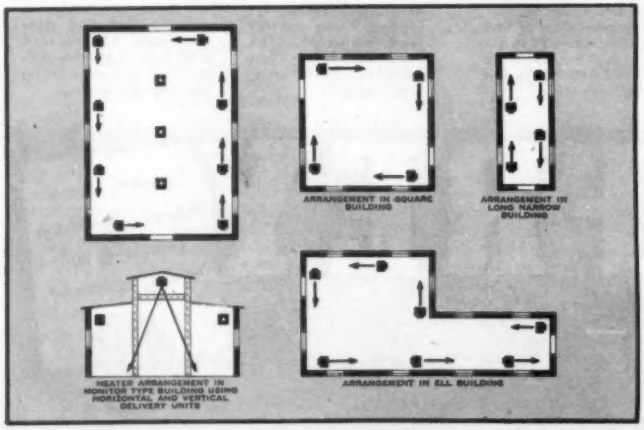
ARRANGEMENT IN SQUARE BUILDING
ARRANGEMENT IN LONG NARROW BUILDING
HEATER ARRANGEMENT IN MONITOR TYPE BUILDING USING HORIZONTAL AND VERTICAL DELIVERY UNITS
ARRANGEMENT IN ELL BUILDING

Fig. 2. Typical heater arrangements to give good, effective flow of heated air

The three basic types of steam or hot water unit heaters are: horizontal discharge, vertical or downblast discharge, and centrifugal type.

Horizontal unit heaters are designed for mounting on side walls or ceiling suspension. Vertical or downblast discharge unit heaters are designed to be suspended from ceilings only. The centrifugal type is a high capacity unit with vertical or horizontal discharge and may be mounted anywhere.

The warm air flow from the horizontal type is downward, away from the ceiling, and directly toward those working areas where heat is needed. Vertical discharge unit heaters are especially advantageous for use in buildings with high ceilings. Warm air is forced down, and out, to cover wide areas.

The fundamental principle of effective space heating by unit heaters is the circulation of relatively large volumes of air at a sufficient velocity and at a final temperature low enough to avoid stratification and the consequent accumulation of excess heat in the upper areas. It is good practice to circulate the air at a rate not less than three air changes per hour based on room volume, and to avoid final temperatures in excess of 135 F.

An increase of air circulation above this minimum value will promote better distribution with a reduction in temperature stratification. Particular attention should be paid to final temperatures where higher steam pressures are employed. In this case the use of low temperature heating elements will prove advisable.

With all suspended-type unit heaters the temperature of the air entering the fan will be higher than that at the 5-ft level or so-called breathing line. This difference will depend in most cases, upon the height of suspension and should be taken into account in determining the effective capacity of the units. It is good practice to allow 1½ deg

Forge . . . Laboratory . . . Cotton Mill . . . Office

Trane Air Conditioning Serves Everywhere in Industry

Your factory's heating, ventilating or air conditioning problem may not be as tough as you think—not with Trane equipment to handle it.

In Forge Shops—A farm machinery manufacturer used Trane Centrifugal Fans in a ventilation system that does double duty in the forge shop. Three big fans on the roof draw smoky hot air out of the shop. In winter, ventilation air, drawn in through floor inlets at the forges, salvages furnace heat to warm the shop.

In Test Labs—Located in the center of an air conditioned building, a physical testing laboratory needed no extra cooling equipment. However, the work in the lab did make plenty of ventilation necessary—always a problem in winter. A Trane Torridor handles the job easily, sending tempered, fresh air through ducts to the room.

In Cotton Mills—Cotton fibers are delicate, and have a tendency to break while being spun into long threads—unless the room humidity is just right. A Georgia cotton mill guards the fragile threads with humidifiers equipped with Trane Heating Coils.

In Factory Offices—There were two objections to ordinary radiators in an airplane factory office: they were too bulky, and the areas near the units were too hot. Trim, wall-mounted Trane Convectors, sending out warmth in gentle, even currents, answered both objections effectively, economically.

In Paper Mills—A paper manufacturer in Michigan had to be careful where he sent heat in his plant. Heat in the wrong place could cause trouble in the finishing or drying processes. He solved the problem with Trane Horizontal Unit Heaters, spotting heat right where it was needed.

Whatever your heating, cooling, ventilating or air conditioning problem is, look for the answer in the complete Trane line.

Cotton Mills—Trane Heating Coils providing temperatures and humidities that protect delicate threads.

Factory Offices—Perfect heating comfort—even right next to the unit—with Trane Convectors that hug walls and save space.

Paper Mills—Comfort heating that won't interfere with the process. Trane Unit Heaters send heat where it's needed.

TRANE

MANUFACTURING ENGINEERS OF HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

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increase in entering air temperature per foot of height that the unit is suspended above the 5-ft level. Thus, if the desired 5-ft level temperature is 60 deg and the unit is suspended 12 ft from the floor (to center of fan), the actual unit inlet temperature will be 70 deg, and the capacity should be selected on this basis.

A widely used method of unit heater control that is simple and reliable is based on the starting and stopping of the unit motor in accordance with room temperature, this is on-off control. This arrangement requires the use of a room thermostat, wired in series with the motor and adjusted to break the circuit when the room reaches the desired temperature.

In cases where more than one unit is to be controlled from a single thermostat, a magnetic switch or relay may be necessary to handle the current. Where the steam supply is intermittent, it is advisable to include in the control circuit a surface thermostat, mounted on the return piping near the unit. The purpose of this control is to keep the motor circuit open until the heating element is filled with steam and thus prevent the blowing of unheated air.

Modulating control is more effective than on-off control because it allows the fan to operate continuously and throttles the steam supply to the heater. This type of control provides a constant discharge, and eliminates intermittent blasts of hot air. The continuous circulation prevents air stratification which is present when the fan is off. Modulating control, generally, is well suited for only those installations where the unit heaters are located 10 ft or more above the floor level to avoid drafts. Essentially, this type of control is accomplished by a proportioning valve in the steam line which operates in response to a thermostat in the area. The fans may be run constantly or switched off manually.

A unit heater system should consist of a number of well distributed units in order to provide the most effective heating. The air flow from one heater should support the air flow of the adjacent unit. Air flow should be parallel to the cold wall wherever possible so that the least amount of cold air film along the wall is disturbed. Disturbance of the cold air film increases the heat loss through the glass and walls.

For maximum worker comfort, unit heaters should be arranged to blow in open spaces, and not directly on workers. Whenever possible, airflow from unit heaters should be across doors and other outside openings. Vertical type unit heaters are often best for counteractive drafts from doors.

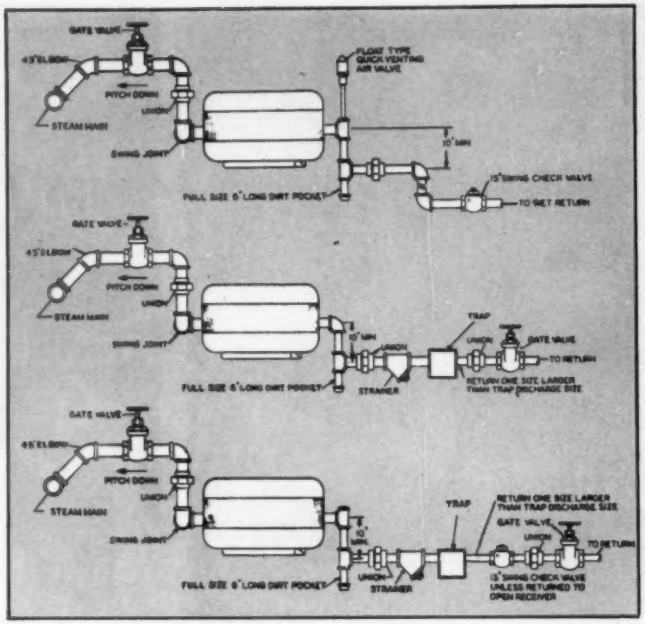


Fig. 3. Details for installation of, top to bottom: vertical, low pressure gravity system; vertical, vapor or vacuum system; and vertical, high pressure gravity

Units should never be installed higher than the maximum mounting height recommended by the manufacturer except when the space below the floor is heated. In such cases, 1 ft to 2 ft may be added to the recommended maximum mounting height. For good performance, unit heaters should be installed with the back or side of the unit not less than 3 ft from the wall.

In some cases, it is preferable to have several small units rather than a few large units. By using several units, more uniform heating and greater flexibility is possible for times when less than maximum capacity is required. Even though one large unit may cost less and be

(Continued on page 146)

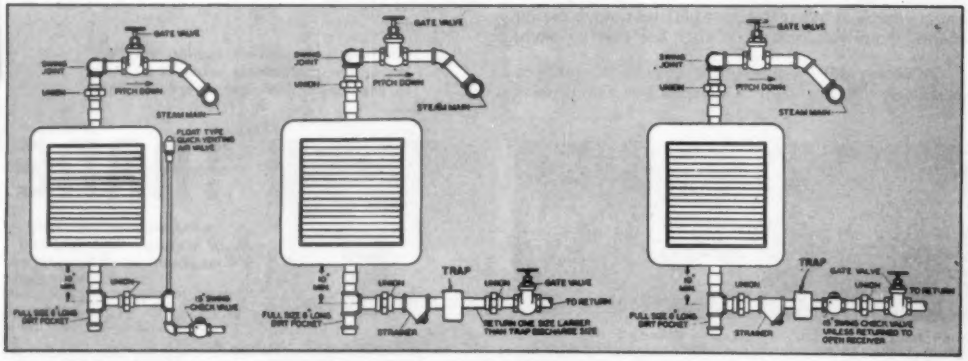
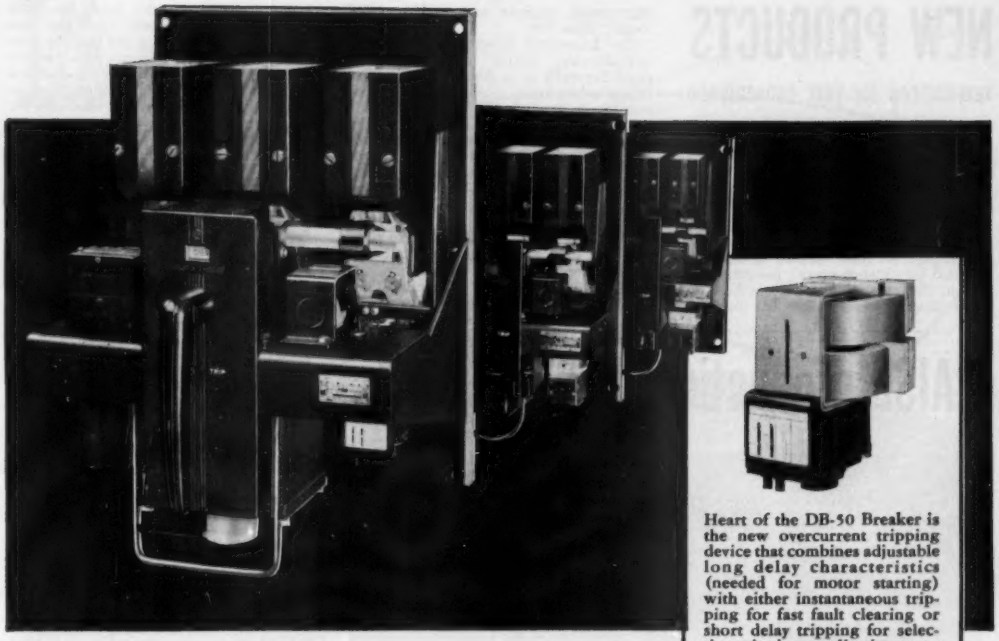


Fig. 4. Piping for horizontal discharge units. Low pressure gravity, vapor or vacuum, and high pressure gravity shown



Heart of the DB-50 Breaker is the new overcurrent tripping device that combines adjustable long delay characteristics (needed for motor starting) with either instantaneous tripping for fast fault clearing or short delay tripping for selective tripping applications.

Now...15,000, 25,000, 50,000 amp.* Breakers *in a UNIFORM DESIGN!*

The new DB-50—most recent addition to the DB line of low-voltage breakers—extends the range of interrupting ratings to 50,000 amperes, continuous current ratings to 1,600 amperes. The co-ordinated design provides uniformity in construction features and operating characteristics, plus a completely flexible overcurrent tripping device.

The ability to close and latch on fault current is the latest and most severe requirement of a modern breaker. This requirement results from delayed tripping schemes designed to provide selective operation. Closely allied is the additional requirement of ability to carry, for periods up to 30 cycles, fault currents equal to the interrupting rating. Contacts, latching mechanism, and closing means of the uniformly-designed Westinghouse DB line of low-voltage air circuit breakers meet these rigid requirements.

The DB-50 has the same desirable unit construction as its smaller counterparts. It is this feature that allows you to add or remove any component as an assembled unit in the field.

Booklets B-4067 on the DB-15 and DB-25, and B-4740 on the DB-50 contain complete information. For copies, call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

See "Electrical Proving Ground" . . . the dramatic story of the Westinghouse High Power Laboratory in sound and color motion picture. For details, see your Westinghouse representative or write Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania. J-60748

*Interrupting Rating

DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH POWER LABORATORY

WESTINGHOUSE

"DE-ION" CIRCUIT BREAKERS

NEW PRODUCTS

summarized for your convenience

LOW COST PURIFIERS

Internal type, for use in steam drums, flash tanks, evaporators

The Hi-eF is a new low cost unit designed to deliver vapor with 1.0 ppm or less of total solids. Manufacturer says it pays for itself quickly in benefits afforded by cleaner steam, pointing out that in the case of steam from boilers, clean steam means longer life for reciprocating engines and turbines and longer tube life.

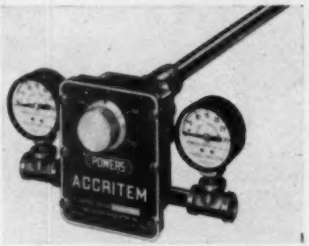
The improved design provides for a self-cleaning action and eliminates need for baffling in boilers and drums. Other advantages cited are low pressure drop through the unit and minimum space occupied inside a drum. Available in a complete range of sizes in fabricated and stainless steels, other alloys. Write for Bulletin 100. Steam Specialty Div., The V. D. Anderson Co., 1935 W. 96th St., Cleveland 2, O.

TEMPERATURE REGULATOR

Is expansion stem type, offers direct or reverse action

A modern version of this manufacturer's dependable temperature regulating instrument, the new Accritem is an expansion stem regulator for maintaining liquids or air at any desired temperature by controlling pneumatic or water operated diaphragm valves or dampers. It features simple, rugged construction and is intended for long service.

Temperature ranges of the Accritem



are given as 50 to 250 F and 150 to 350 F, and it requires compressed air or water at 15 lb pressure. The sensitive element is an invar rod enclosed by a silver soldered copper bulb. No extra tools are required to change it from a direct-acting to reverse-acting instrument, and it's easily installed at point where temperature is to be controlled. It's suggested for use on instantaneous water heaters, heat exchangers, large water storage heaters, and for jacket water applications, dry bulb and dew point control. Operation explained in Bulletin 316 available from manufacturer. The Powers Regulator Co., 3501 Oakton St., Skokie, Ill.

TEMPERING VALVE

Delivers water to faucets or fixtures at approximately 140 F

Said to stretch tankless heater performance and guard against excessively hot water, the new Type B Tempering Valve is an improved version of company's Type S, widely used for the past 12 years. The element is constructed of phosphor and commercial bronze as well as stainless steel so as to prolong its life under adverse service conditions. Suitable for small plant installations, the valve is supplied in ½ and ¾ in. sizes. Taco Heaters, Inc., 137 South St., Providence 3, R.I.

BOMB RESISTANT WINDOW

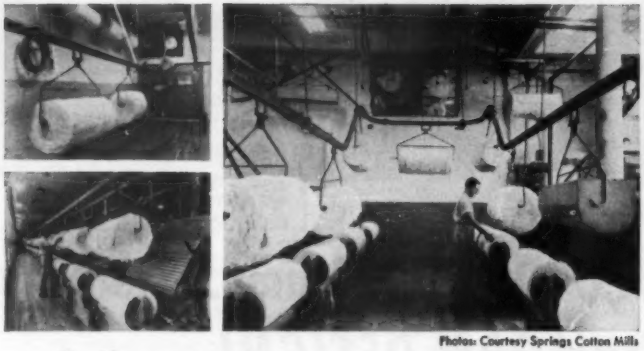
Of glass plastic laminate, to minimize effects of explosive forces

Said to virtually eliminate dangers of flying glass in explosion areas, the Flexseal Bomb Window resists normal atmospheric pressures because of special design properties. When these are exceeded by a bomb blast or pressure wave the window is designed to open automatically by folding about its edges, and this action releases the pressure and keeps the frame from being blown in.

The window consists of three layers laminated into a single unit. The outer layer is a sheet of glass, the middle layer is a partially segmented sheet of polyvinyl butyral plastic, and the inner layer consists of four triangularly shaped pieces of glass, the central edges of which register with the segmented edges of the plastic. The plastic layer extends beyond the glass edges and is bolted to the window frame to

(Continued on page 110)

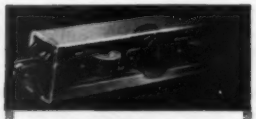
RAISE production...LOWER costs



Photos: Courtesy Springs Cotton Mills

with "Zig-Zag" Continuous Power Conveyors

Here you see how "Zig-Zag" solves a complex handling problem in the Springs Cotton Mills at Lancaster, South Carolina. In almost every imaginable industry, R-W "Zig-Zag" Conveyors are serving production and processing lines—increasing efficiency, cutting costs. Specifically designed to carry light loads through confined or crowded areas, "Zig-Zag" is adaptable to almost every plant condition or layout. And the savings effected with R-W "Zig-Zag" Conveyors are so substantial, the equipment pays for itself quickly—in most cases in less than a year! For further information, call, write, or wire our nearest office.



Engineered for Economy and Flexibility

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves —two-foot radius.

1880 RICHARDS WILCOX 1951

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OVER 71 YEARS

Richards-Wilcox Mfg. Co.

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It's new... so it's MARLEY!

MARLEY
Laminated Fan Cylinder
PATENT APPLIED FOR
THE MARLEY CO., INC.
KANSAS CITY KANSAS

Cooling Tower Fan Cylinders

that are entirely new, distinctive in design . . . are another major addition to Marley's long list of achievements in cooling tower advancement.

Laminated Fan Cylinders are the sturdiest ever applied to cooling towers. Built entirely of overlapping layers of redwood boards, they are structurally strong . . . uniformly strong at every point. No metal shape rings or clamp strips are needed; there is nothing to corrode, loosen or vibrate. Laminated Fan Cylinders are built of the same material as the towers they serve . . . built to last as long.

MODERNIZE ANY LARGE INDUCED DRAFT TOWER

Laminated Fan Cylinders will reduce maintenance time and upkeep expense on *any* large cooling tower. No painting, no replacing rusted metal parts — you check fan cylinders off the maintenance list when you install modern Laminated Fan Cylinders. Engineers have ordered many of these fan cylinders for replacement since Marley recently made them available.

also producers of
DOUBLE-FLOW TOWERS
CONVENTIONAL TOWERS
DRICOOLERS
NATURAL DRAFT TOWERS
SPRAY NOZZLES

For detailed information, call your Marley representative or write for LP-30a.

The Marley Company, Inc.
KANSAS CITY 15, KANSAS

MARLEY

A typical Remington Rand Tool Crib Control system, employing Kolect-A-Matic Visible Record Equipment*

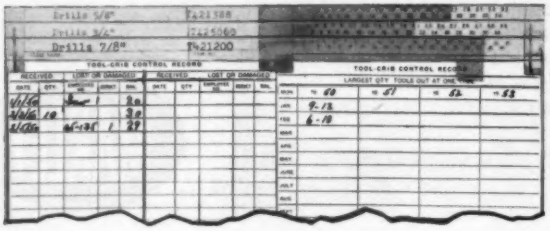
The BEST tool crib system won't cost you a penny!

When a rush request comes in for a tool that's needed to keep production moving—that's when you realize the value of tool crib control at its best. The small investment it takes to set up a 100% system is quickly amortized (1) through assured availability of tools, accurately scheduled to meet production line demands, (2) through numerous savings, which we can readily demonstrate, on tool purchase, use, repair and maintenance and (3) through reduced tool crib personnel.

COMPLETE CONTROL BY TOOL AND BY WORKER

It's actually easier, takes less work, to maintain *complete* control over tools than to rely on make-shift routines. Remington Rand Tool Crib Systems keep paperwork at an absolute minimum—simplify the filing and finding of records by tool and by worker, and give you at all times a *visible* picture—as graphic as a bar chart—of your tool supply status.

Send for free folder, KD 641, and get the basic story on Remington Rand Tool Crib Control. See how economically our experience-proved forms and equipment adapt to your specific needs, whatever your size or type of factory operation. Phone our nearest office or write Management Controls Reference Library, Room 1341 315 Fourth Avenue, New York 10, N. Y.



*Two systems are available to give you control by tool and by worker. In this Kolect-A-Matic record, signals show tools on hand or in use. As with the alternate KARDEX VISIBLE system, you know who has each tool, how long, when to reorder, rate of usage. Free folder shown above fully explains both systems.

Remington Rand

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NEW ORLEANS
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WHEREVER YOUR LOCATION...

YOU ARE ALWAYS CLOSE TO CLEAVER-BROOKS FACTORY-AUTHORIZED SERVICE

CLEAVER-BROOKS steam boiler service facilities are national — to enable you to get the most in performance through proper care and maintenance of your boiler.

YOU GET...

Starting Service: Boilers are placed in operation by Cleaver-Brooks field representatives who check installation, operation, and make a complete and detailed Field Report to you and to Cleaver-Brooks.

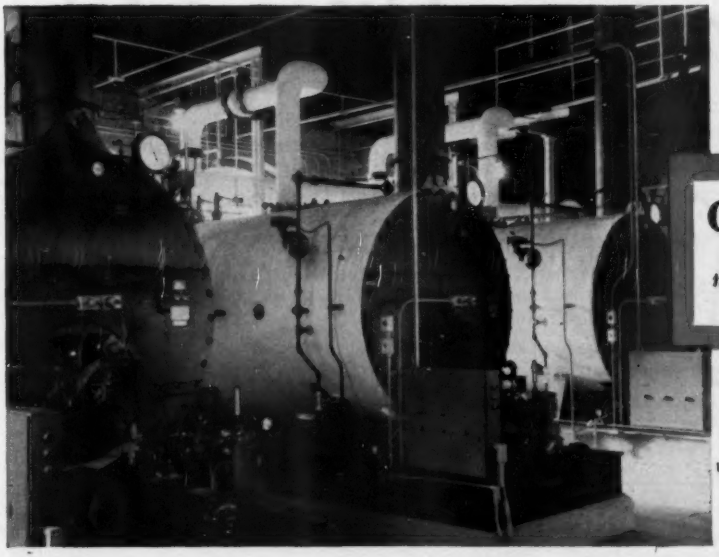
Operation Manuals: Your operators are trained in care and operation by Cleaver-Brooks and furnished with comprehensive, easy-to-understand operation manuals.

YOU HAVE READILY AVAILABLE

Parts: Cleaver-Brooks replacement parts are quickly available through field representatives, parts depots, and the factory.

YOU WILL FIND IT PAYS...

to equip with Cleaver-Brooks — steam boilers that operate at a guaranteed efficiency of 80% — burn gas, oil, or combination gas and oil — fully meet all codes — standard models available in sizes 15 to 500 hp.; 15 to 200 PSI.



Write for latest, fully illustrated and descriptive Cleaver-Brooks Steam Boiler catalog.

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STEAM BOILERS
the first and finest of their class

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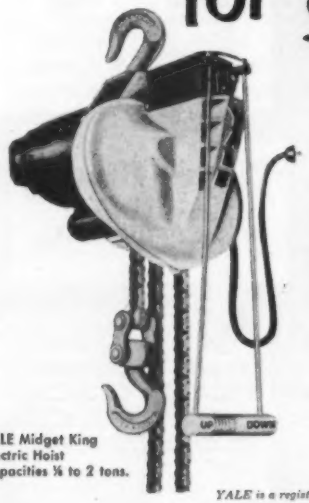
307-J E. Keefe Ave., Milwaukee 12, Wis., U.S.A.
Cable Address: Clebro-Milwaukeewis
Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners

There's a YALE hoist for *every* lifting job!



YALE Midget King Electric Hoist
Capacities ⅛ to 2 tons.

• NOT ALL TREASURES are found in buried sea chests. Ask the men who have to do industry's heavy lifting—or pay the bills for it.

They'll tell you that when you've got a YALE hoist, you've got a *real treasure*—a money-and-muscle saver that's *exactly right* for your specific needs.

There's no need to compromise on a hoist that's "almost" right because YALE makes all types of hoists, all sizes, all capacities. You name it. YALE's got it!

Take the hoist shown here. For fast spotting of loads you just hang it up, plug it in and it's ready for easy, one-hand operation!

Your YALE distributor will help you select the hoist that will do more and save more for you. Call on him soon. Or write: The Yale & Towne Manufacturing Co., Dept. 479, Philadelphia, Pa.

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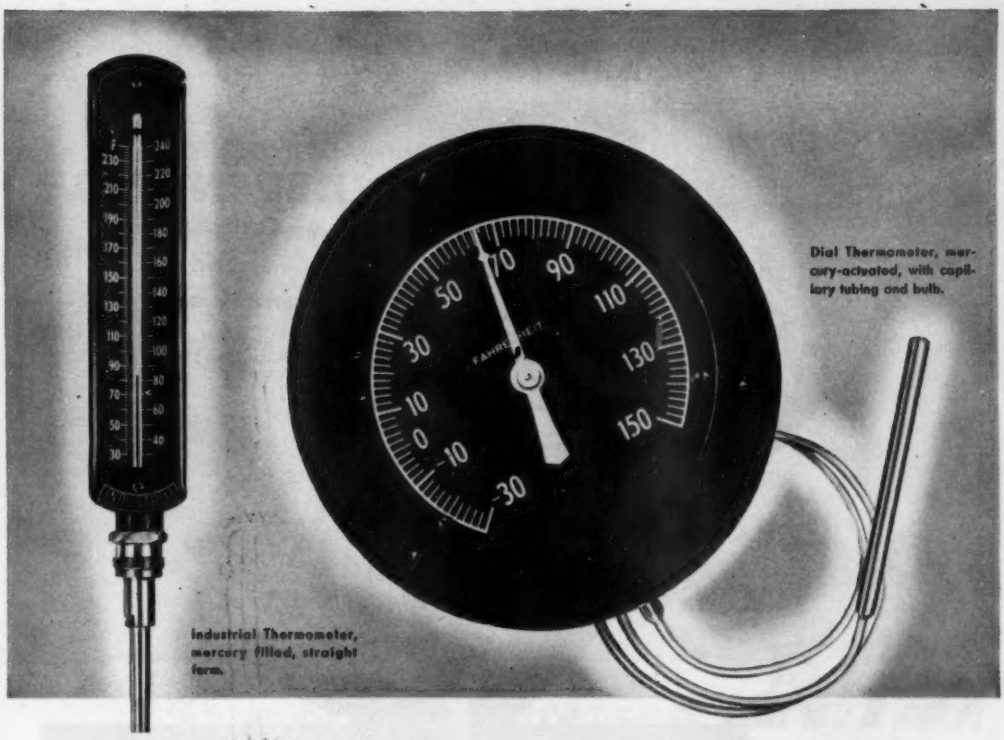
YALE & TOWNE

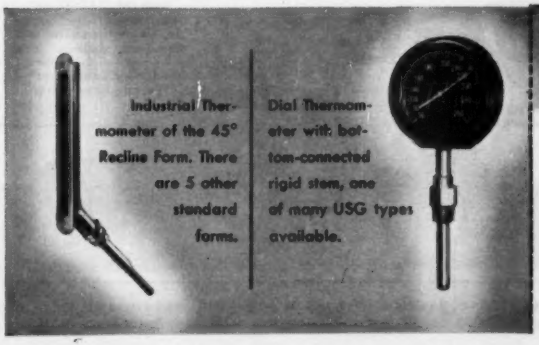

Industrial Thermometer, mercury filled, straight form.
Dial Thermometer, mercury-actuated, with capillary tubing and bulb.

HAVE YOU AN INDUSTRIAL TEMPERATURE TO TAKE?

Whenever an industrial temperature has to be taken there is a USG thermometer for the job. You have your choice of the Industrial Type in all sizes, and mounting forms with standard or protected stems; or the Dial Type in a variety of sizes, case styles, mountings, ranges, and connections. Gas, mercury or vapor-actuated.

For typical applications of commercial and approved Navy Standards, covering dimensional information and the use of bushings, flanges, sockets and special tubing, send for Catalogs 100 and 200.

Special thermometers for dough testing, milk testing, fuel gas, candy, solder baths, varnish, canning, vulcanizing and other unusual processes.


Industrial Thermometer of the 45° Recline Form. There are 5 other standard forms.
Dial Thermometer with bottom-connected rigid stem, one of many USG types available.

UNITED STATES GAUGE

United States Gauge
Division of American Machine and Metals, Inc.
Sellersville, Pa.

Gentlemen: We are interested in USG ☐ Industrial Thermometers; ☐ Dial Thermometers. ☐ Please send us your catalog. ☐ Have your man call. No obligation, of course.

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DEPENDABLE
under severest conditions of dust and dirt!

DODGE-TIMKEN

- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16"to 4-15/16".

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CALL THE TRANSMISSIONEER, your local Dodge Distributor for assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!

V-BELTS AND TAPER-LOCK SHEAVES

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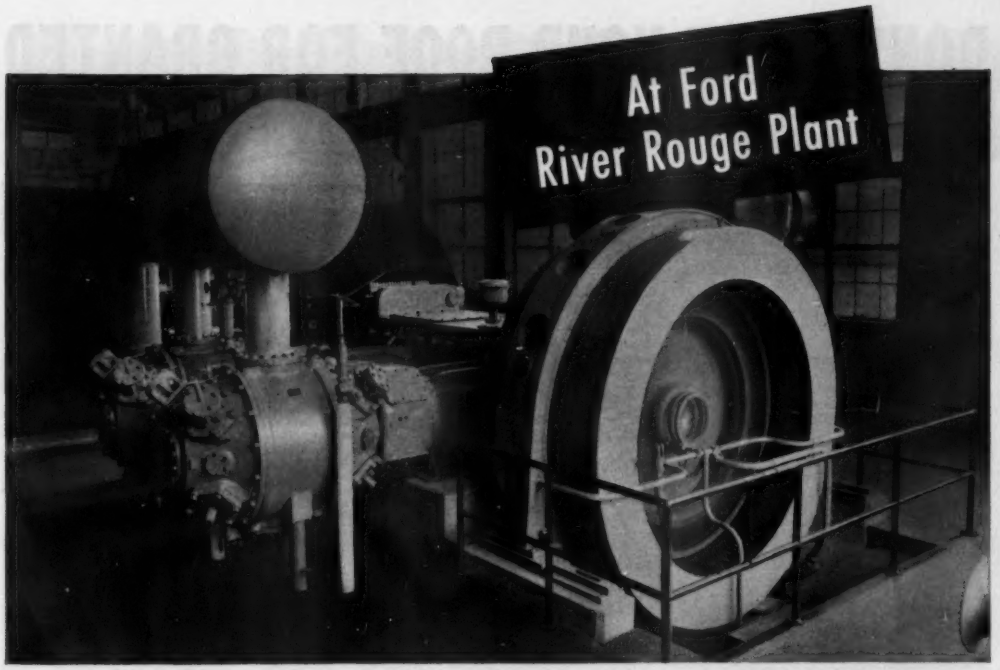
NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO, ILLINOIS



25% more compressed air ...half the floor space

This is the 2000 bhp Clark CBA-4, Balanced/Opposed, Motor-Driven Compressor of 10,000 cfm capacity which Ford Motor Company recently added to its River Rouge Plant. Duty: To shoulder the increased load requirements of its 105 psi air system network.

Aside from the fact that Ford is getting 25% more air out of this rugged Clark unit, in approximately one-half the floorspace required by any of the older units in service . . . besides the savings in time and manpower gained through simplified installation in *days* rather than *weeks*, Ford is on the "plus" side in many other important respects. Among them: Vibrationless operation, achieved by Clark Balanced/Opposed Design; simplified, reduced foundation requirements; inherent accessibility and marked simplicity of design.

Covering a range of 150-4500 bhp, the Clark Balanced/Opposed, Motor-Driven line is increasingly becoming industry's preference for plant air requirements. Complete details and literature are obtainable from your nearest Clark representative.

CLARK BROS. CO., INC.

One of the Dresser Industries

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MIDGET ANGLE • RIGHT ANGLE • BIG ANGLE
ELECTRIC-DRIVEN • CENTRIFUGAL

SEE the difference in . . .

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DON'T TAKE YOUR ROOF FOR GRANTED

Get a Roof Survey Report free of charge!

The Built-Up Roof Survey Report tells exactly what condition your roof is in, gives you a permanent record, helps you plan ahead for roofing maintenance. Get this free survey made *now!*

Even though your roof doesn't *seem* to be leaking, it may be in need of attention. Many a roof with torn flashings, dried-out felts, even rotted decks has been assumed to be in "good condition."

To anticipate costly damage, often hidden, and numerous repair bills, hundreds of plant engineers and maintenance executives have already used the free Johns-Manville Roof Survey Report.

The Roof Survey Report is an accurate picture made by a roofing *expert*, the J-M approved Built-Up Roofing Contractor. It covers all critical areas —flashings, decks, roofing felts, parapet walls, skylights, etc. And it will cost you only the trouble of asking for it.

Let us send you the interesting booklet, "Things You Should Know About Your Roof." It gives complete information about the *free* J-M Roof Survey Plan together with the full story of J-M Flexstone* Asbestos Roof and the Asbestile* Flashing System. Write Johns-Manville, Dept. PE, Box 158, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

*Reg. U. S. Pat. Off.

Mail your Request today

Johns-Manville, Box 158,
Dept. P.E., New York 16, N. Y.

Please send me the free booklet, "Things You Should Know About Your Roof", and have your Approved Built-Up Roofing Contractor see us about making a free survey.

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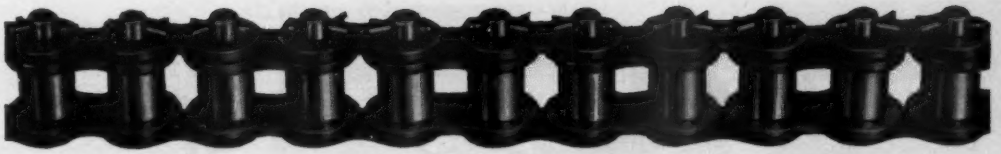
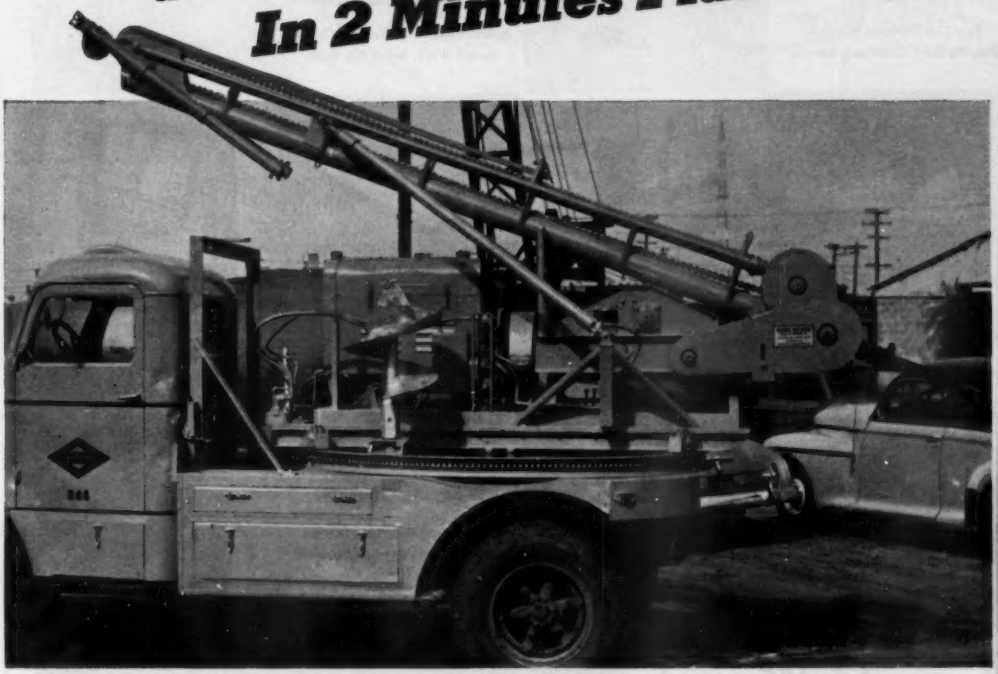
Johns-Manville FLEXSTONE Built-Up Roofs

ASBESTOS CORRUGATED TRANSITE* • ACOUSTICAL CEILINGS DECORATIVE FLOORS • MOVABLE WALLS • ETC.



WHITNEY CHAIN DRIVES

Help the Williams Hole Digger Put Down a 9 Foot, 18 Inch Diameter Hole In 2 Minutes Flat



This ingenious machine, manufactured by the Hugh B. Williams Manufacturing Company, can dig holes up to 3 feet in diameter and 9 to 25 feet deep by variations in the unit. Under normal conditions the digger can put down a 9 foot, 18 inch diameter hole in two minutes. That's speed... and it calls for a ruggedly built chain drive that will travel and stand up too.

For positive power transmission and high performance under all operating conditions, Williams uses Whitney Chains throughout for driving the various units. Despite rocks and other obstructions often encountered, Whitney Roller Chains take tough usage in stride — keep working, day in, day out.

Here's what this company says about Whitney Chain performance:

"We have been consistently using Whitney Chain in our machines because we have always found it to be strong, uniform and of excellent construction throughout. Wearing qualities are above average and in our machines, which are used in all weather conditions, this is very important. In short, we feel that your chain has given excellent performance in every respect". — T. E. Green, Sec. Treas.

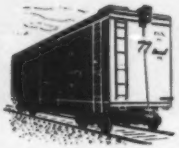
You, too, can keep your equipment operating longer, simplify your designs and cut costs by standardizing on Whitney Chain Drives.

Consult your local Whitney Field Office or Distributor, or write direct for complete information and catalog.

WHITNEY CHAIN COMPANY

232 Hamilton Street, Hartford 2, Connecticut

LARGE PANEL SIZE



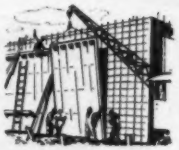
Over 100,000 Railroad Cars Have Plywood Siding and Lining

EASY TO WORK

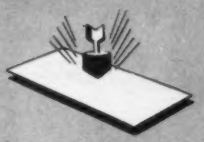
Plywood Simplifies Pattern Work; Offers Design Adaptability

Low-Cost Plywood Bins Are Easy To Build, Give Long Service

LIGHT WEIGHT

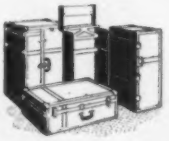


Re-Usable Plywood Concrete Forms Speed Work, Lower Job Costs

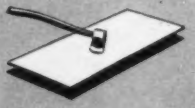


PUNCTURE-PROOF

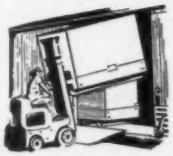
GREAT STRENGTH



Plywood Boxes for Luggage Lend Strength, Light Weight

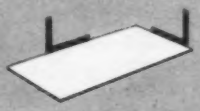


SPLITPROOF

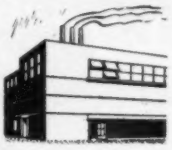


Long-lived Plywood Shipping Cases Are Light, Strong, Re-Usable

Durable Exterior Plywood Builds Sea-Going Fishing, Work Craft



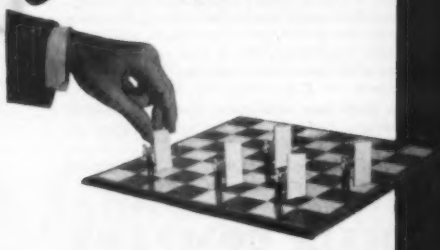
DIMENSIONALLY STABLE



Big Plywood Panels Speed Work On Building and Remodeling Jobs

NATURAL BEAUTY

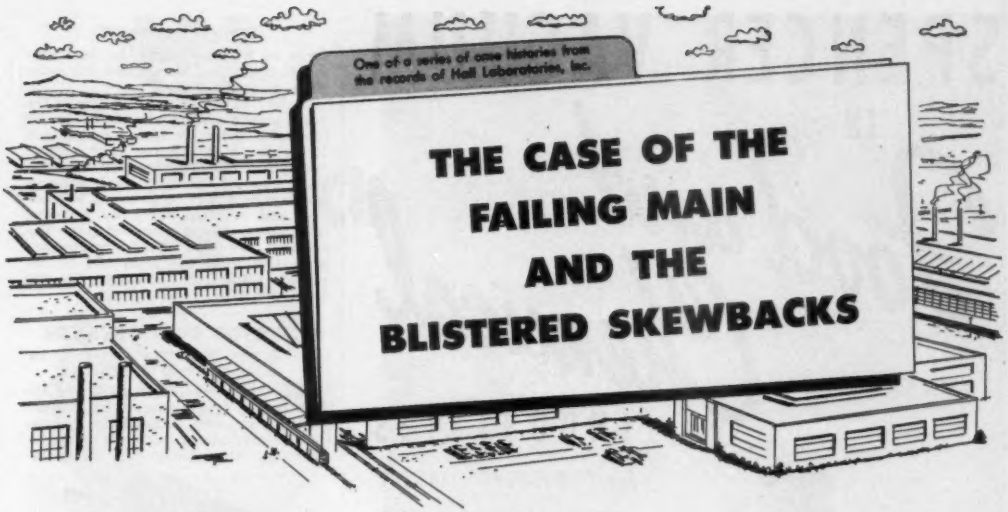
Smart Move!

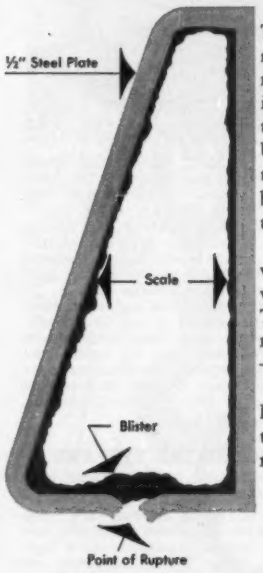


● Checkmate *your* production problem! Here's a versatile, economical, fast-to-work, hard-to-hurt material that can help you *right now*! Whether you need a material to speed work on a plant or a product, a tough, all 'round packaging and maintenance material or a dependable alternate for critical metals . . . make the *smart* move—to plywood. For information or technical assistance on special problems, write: (USA Only) Douglas Fir Plywood Association, Dept. 479, Tacoma 2, Wn.

Douglas Fir Plywood

AMERICA'S BUSIEST BUILDING AND INDUSTRIAL MATERIAL


One of a series of case histories from the records of Hall Laboratories, Inc.
THE CASE OF THE FAILING MAIN AND THE BLISTERED SKEWBACKS



Failure of one of these water-cooled skewbacks supporting the roof of a furnace means lost production and interrupted work schedules. Threshold treatment stopped deposition of scale, eliminated resultant overheating and failure.

The water system in a Western copper refinery consists of almost 2 miles of buried mains and branch lines, of sizes from 16 inches down to 4 inches, and additional thousands of feet of smaller service lines. Uninterrupted supply of water throughout this system is essential for cooling skewbacks, furnace jackets, pads and doors in the anode and wire bar furnaces.

For years this refinery struggled with a water problem—scale laid down by the water wherever it cooled a hot surface. Then, suddenly, the failure of a 6-inch main announced a second critical problem —corrosion.

The double trouble was placed before Hall Laboratories, who recommended threshold treatment with a few parts per million of Calgon to solve in one stroke the difficulties with both scale and corrosion. Since August of 1946, this treatment has not only inhibited internal corrosion and prevented deposition of new scale, but has also cleaned out old accumulations of scale and rust.

In contrast to the earlier history of difficulties, no failure has occurred since threshold treatment was started under the supervision of a Hall engineer. Rupture of a single skewback, failure of one branch line would, in all likelihood, cost many times the yearly charges for treatment.

Whatever your water supply problems are, Hall engineers are ready to help solve them. Their experience is wide and varied, and proof of their accomplishments is in the long lists of satisfied users of the services offered by Hall Laboratories.

HALL LABORATORIES, INC.

(A Subsidiary of Hagan Corporation)

HALL PLANT WIDE WATER SERVICE

Consultants on Procurement, Treatment, Usage and Disposal of Industrial Water

Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Please send me your bulletin: Let's Consider Your *Whole* Water Problem.

Name_____

Position_____

Company_____

Street & Number_____

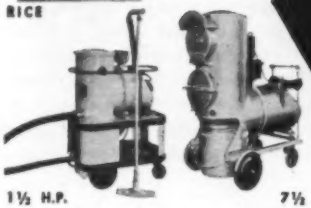
City_____ Zone_____ State_____

PL-9

SPENCER VACUUM IN *Food and Chemical* INDUSTRIES

for CONVEYING • INSECT CONTROL • PACKAGING PRODUCTION • RECOVERY SANITATION

RICE



1½ H.P.

7½ H.P.

CHEMICALS

The time required for moving, cleaning, sorting and packaging valuable foods and chemicals has been materially reduced by Spencer Vacuum. Rice and powdered chemicals are handled by the ton. Excess powdered sugar is recovered from chocolate candies, the insect hazard removed at its source and the entire plant made continuously sanitary as an extra dividend, with the same Spencer machine.

Large areas, inaccessible spots in machines and tanks, above pipes and behind radiators are cleaned quickly with powerful vacuum tools. A Spencer size and vacuum tool for every purpose, including offices, boiler rooms and warehouses. Ask for the Bulletins.

427-A

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER HARTFORD

(Continued from page 98)

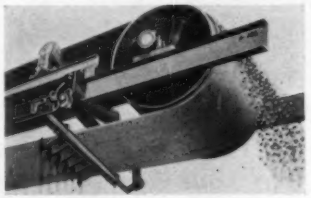
serve as hinges—letting the four segments open like doors when the outer plate glass is broken.

"Safety valve" of the window is the vinyl plastic said to stretch up to 400 per cent of its unstressed length and return to ½ of one per cent without rupture. After an explosion of sufficient force to open the bomb window, the segments may be returned to position and retained there by adhesive tape, putty, or even chewing gum. The restored window affords transparent protection until the glass can be replaced. Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa.

CONVEYOR BELT CLEANER

Spring type, is adaptable to existing conveyor installations

Although not previously publicized the S-A Spring Type Conveyor Belt Cleaner has been used successfully on conveyor installations for several years, according to manufacturer. In opera-



tion, self aligning, spring steel wiper blades set perpendicular to belt surface, but diagonal to belt travel, wipe the belt clean and dry as it passes. Spring arms supporting the blades maintain a uniform pressure on the belt and let the blades ride easily over splices. Dribble from the cleaner falls directly into the discharge chute.

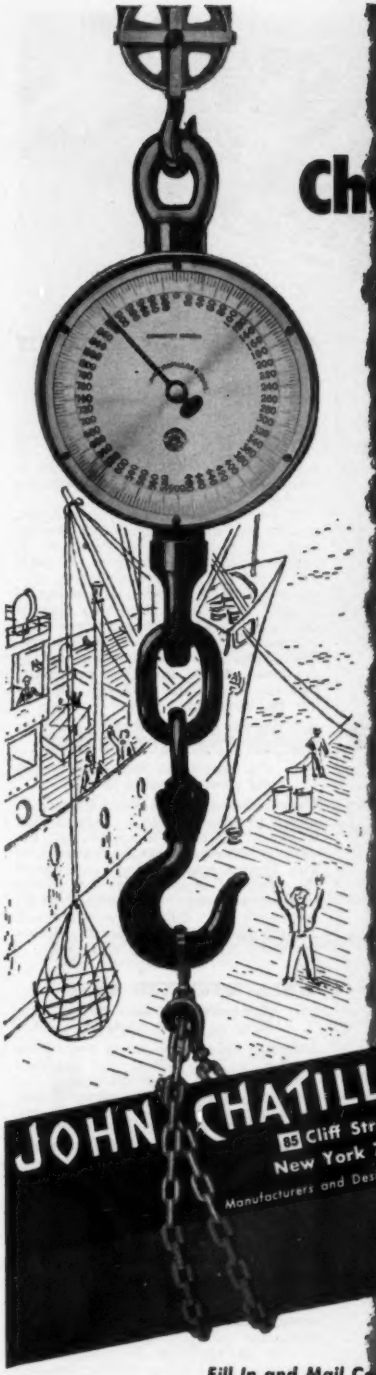
Since the wiper has an independent mounting assembly it can be adapted to fit existing installations. Adjustments and replacements can be made from either side without interrupting conveyor operation. Cleaner is described in Bulletin 651. Stephens-Adamson Mfg. Co., Aurora, Ill.

EXTINGUISHING SYSTEMS

Mechanical foam type, for combatting flammable liquid fires

Mechanical foam systems are now available for use where flammable liquids are stored. Operation of a mechanical foam system depends on normal plant water pressure to draw, mix and deliver the fire extinguishing agent, manufacturer points out, and in large installations where main pressures would be inadequate, special pumping may be required.

The components of foam are water, foam liquid, and air. The basic mechanical foam system starts with water under pressure passing through pipes or hoses. The water velocity creates a vacuum which draws the proper amount of foam liquid from its storage chamber into the stream. Further along, a second vacuum is created which pulls air into the water-foam solution. Then it is "mixed" to create a fire-killing foam, and discharged over the burning liquid from manually controlled hoses or fixed units. Walter Kidde & Co., Inc., 40 E. 34th St., New York 16, N. Y.



Chatillon Crane Scales

are engineered for faithfully accurate heavy duty weighing!

These remarkable spring-type, direct reading and large capacity Chatillon Crane Scales are engineered to withstand rugged service that would ruin other types of weighing apparatus.

Built for 1,000 to 10,000 capacities, each scale is equipped with two special alloy steel springs, precision calibrated and designed for maximum safety. Virtually indestructible, every Chatillon Crane Scale has a recoil mechanism which protects the rack and pinion against sudden shock, a recessed dial to protect pointer; large easy to read aluminum dial with black graduations and figures, and cases made of malleable iron, with top and bottom rings drop forged. Lightweight and less cumbersome, a 5,000 lb. Chatillon Crane Scale weighs only 93 lbs.

REMEMBER: *John Chatillon & Sons will design and manufacture scales and other measuring devices to meet your particular needs.*

Cat. No.	Cap. Lbs.x Lbs.	Ship. Wt.
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12-1000D	1000x5	74
13-2000D	2000x5	78
15-5000D	5000x10	93
16-10000D	10000x25	240

Weights given above are shipping weights. To order Crane Scale with Hook, add letter H to Catalog number, i.e.: 10-1000DH, 13-2000DH, etc.

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- ☐ Push Pull Gauges
- ☐ Force Measuring Devices

Name_____ Company_____

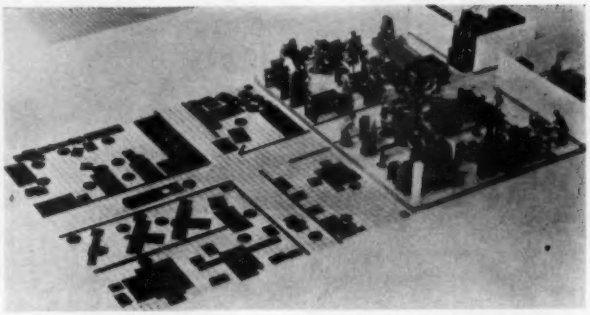
Address_____ Position Held_____

QUICK BLUEPRINTING METHOD

For making blueprints or Ozalid prints from three-dimensional layouts

In the new Repro-Templet System a photographic film templet, coated with a pressure-sensitive cement, is furnished to match each piece in the model layout. Once the layout is complete the Photo-Repro-Templets are affixed to a film grid sheet, and this becomes the master from which as many prints as needed may be secured.

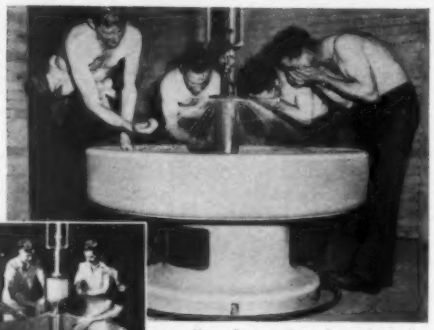
Announced as a real time saver in conversion and expansion projects, this new process is reported to have saved some 26,000 man-days of planning and layout time during the recent conversion of a large automotive plant at Willow Run. "Visual" Planning Equipment Co., Inc., Pennsylvania Ave., Oakmont, Pennsylvania.



Provide Maximum In SANITARY WASHING FACILITIES

For All Employees Men and Women

Bradley Full Circle Washfountains serve 8 to 10 persons simultaneously—each with clean running water from central sprayhead. The standard in sanitary fixtures for over 30 years. With foot-control, water flow is cut off automatically when washers leave.



Men often wash to the waist in the clean running water provided by Bradley Washfountains

No Faucets to Touch—No Chance of Transmitting Germs

● Sanitary Bradleys are used throughout industry—in large and small plants. They provide maximum facilities in minimum space, reduce by 70% piping connections and cut water consumption. With foot-control there are no contacts with faucets so no chance of transmitting germs. The large bowl is self-flushing to prevent collection of used and contaminated water.

To save time and guard health, add Bradleys now. BRADLEY WASHFOUNTAIN CO., 2371 W. Michigan St., Milwaukee 1, Wis.

For Small Washrooms Install Bradley DUO-Washfountains

Ideal for executive and clerical washrooms—in cafeterias, laboratories, work shops. Two persons served by sprayhead. Foot-control eliminates faucets and prevents water waste.

Send for free illustrated Catalog 4701.

BRADLEY washfountains

Distributed through Plumbing Wholesalers

PORTABLE HYDRAULIC UNIT

Has 3-in. rubber casters, takes pulling tools right to the job

The Hydra-Tote holds company's complete hydraulic pulling system and with the new Power-Twin ram and pump combination it's decidedly useful for maintenance work. It also provides a 17½-t hydraulic press right where it's needed.

Of sturdy, welded steel construction, the Hydra-Tote is 32 in. high, 36½ in. long and 16 in. wide at the base. It has permanent steel hangers for basic items and a tray for extra parts. Almost unlimited vertical adjustment is possible with interchangeable legs in the upper press frame and three easy adjustments in the lower press frame. More details on the labor-saving Hydra-Tote will be furnished by manufacturer. Owatonna Tool Co., 446 Cedar St., Owatonna, Minn.

ROTARY PRESSURE JOINTS

Self-supporting type, for operating pressures up to 250 lb

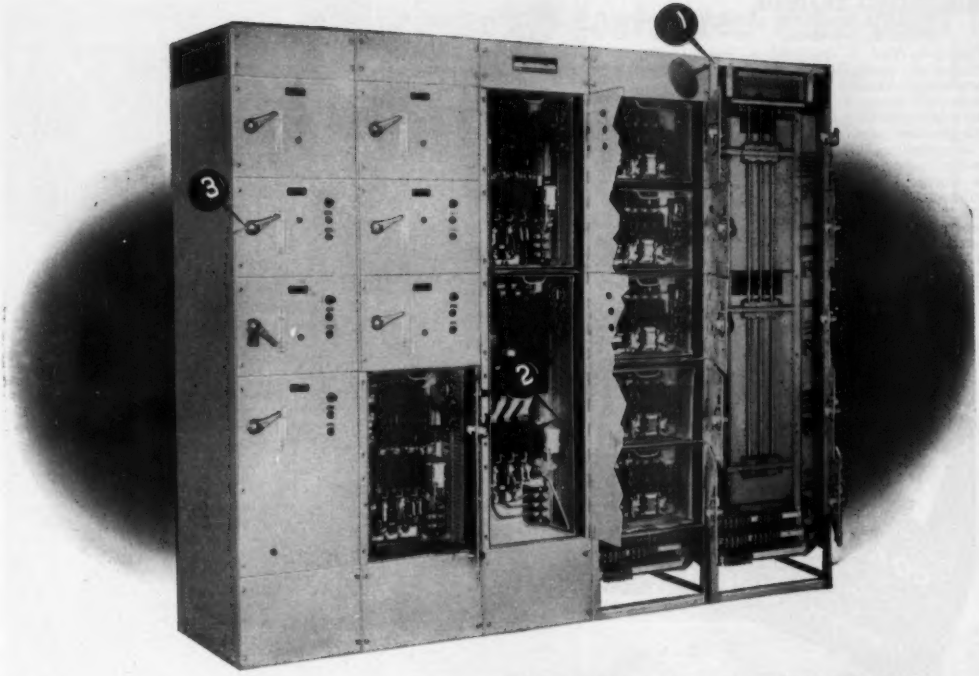
These rotary pressure joints have been added to manufacturer's Type S line to extend their use to applications involving higher operating temperatures. The Type S was developed to combat the threat of misalignment for service on machines where considerable lateral movement of rolls is encountered. Joint is packless, self lubricating. Johnson Corp., Three Rivers, Mich.

WALL MOUNTING REEL

For easier and more efficient handling of heavy electrical cable

Although different in many ways from company's Port-O-Reel for handling small extension cords, the new Powereel is said to offer the same advantages—saving time and labor and reducing cable wear. It was developed to handle or transport cable having a stationary application.

The Powereel has a special mounting flange on the side so it can be fastened to a base by the use of four ⅜ in. bolts. This flange is threaded to fit a 1 in. iron conduit or afford a watertight connection for flexible feeder cables. While the size of the cable governs the amount which can be wound onto the reel, the new model accommodates sizes up to No. 4 four-conductor cable. A collector ring assembly is provided to prevent interruption in current during winding or unwinding of cable. Literature and prices available. Industrial Electrical Works, 1511 Chicago St., Omaha 2, Neb.



Everybody says "WELL BUILT"

And they really mean it when referring to Westinghouse Control Centers. Here you get top-quality construction which gives you all the advantages of centralized motor control . . . quality at every one of the following points:

1. **Sturdy, Self-Supporting, Tight Structures.** No need for angle iron or other bracing. No gaps or cracks to permit entrance of foreign objects. Interior is fully protected.

2. **Complete Baffling** localizes unusual arcing if faults occur. A short circuit in one starter unit cannot spread throughout the entire structure. Removable grill baffle on right side of each unit provides easy accessibility.

3. **Safety Doors,** with safety-interlocking handles, remain on the panel when the starter unit is removed. Doors can be fastened closed over open space to prevent entrance by unauthorized personnel.

For further evidence of a "well-built" control center, check these features: self-cooling construction for foolproof ventilation, plug-in starter units, vertical and horizontal wiring troughs.

You get all these features and more, when you specify Westinghouse Control Centers. The complete story is contained in Booklet B-4213. For your copy, write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-27009

DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH POWER LABORATORY

WESTINGHOUSE

CONTROL CENTERS

MOTORIZED TRACTOR

For accurate spotting of loaded trailers, use in narrow aisles

The Grip-Tow is designed to operate with almost any caster-type trailer having an edge projection. Company points out that it permits right angle turns with the center of the turn being the fixed axle of the trailer, giving the shortest possible steering radius.

In operation, this motorized tractor is driven to the end of the trailer and a button pressed to engage a hook on the tractor with lower side of trailer frame. This hook then pulls the trailer up to the tractor and a pair of secondary hooks reach out and grab the top part of the trailer frame. Finally the trailing wheels of the tractor lift off the floor so the rear of the tractor is supported on the trailer. Philadelphia Div., Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

PITT CHEM

COAL TAR PIPELINE ENAMELS

Guard Many of the Nation's Greatest Pipelines against Corrosion

PITT CHEM Tar Base Pipeline Enamel is a basic material of the tough, metal-preserving sheath that guards thousands of miles of America's greatest underground pipelines from corrosion. Dependable PITT CHEM coatings are being specified for more new lines each day because they're easier to apply and more dependable in service—the result of unvarying quality control made possible by our completely integrated operation.

● You can get prompt delivery now on Standard, Modified and Plasticized grades of PITT CHEM Pipeline Enamels and Primers.

WBD 2792

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Protective Coatings Division

PITTSBURGH
COKE & CHEMICAL CO.
GRANT BUILDING • PITTSBURGH 19, PA.

SHOCK RESISTANT ROPE

To protect linemen, maintenance and electrical workers

SeLectric Rope, now available to industry, is a manila rope chemically treated and processed to "fight off water" and possess non-conductivity factors. Test results are reported to show that where it requires only 5 kv of voltage impressed on a 5 ft piece of untreated ½ in. rope to produce 10 ma of current, as much as 73 kv is required to force the same current through SeLectric Rope. Prices are comparable to other manila rope, according to manufacturer, who offers test booklet and sample length to plant engineers who write for them. South Eastern Cordage, 665 N.B.C. Building, Cleveland 14, O.

LANDING MAT

Of rubber and Airfoam, to cut destructive handling losses

Originally designed for the paper manufacturers, this landing mat is of service wherever heavy articles are subject to damage when being handled. It's built up with a 2½ in. center of firm Airfoam and a top and bottom cover of lively rubber about ¼ in. thick. The Airfoam absorbs the shock and the cover ties the mats together. The Goodyear Tire & Rubber Co., Akron, O.

BATTERY CHARGER

For mounting on balconies or shelves to save floor space

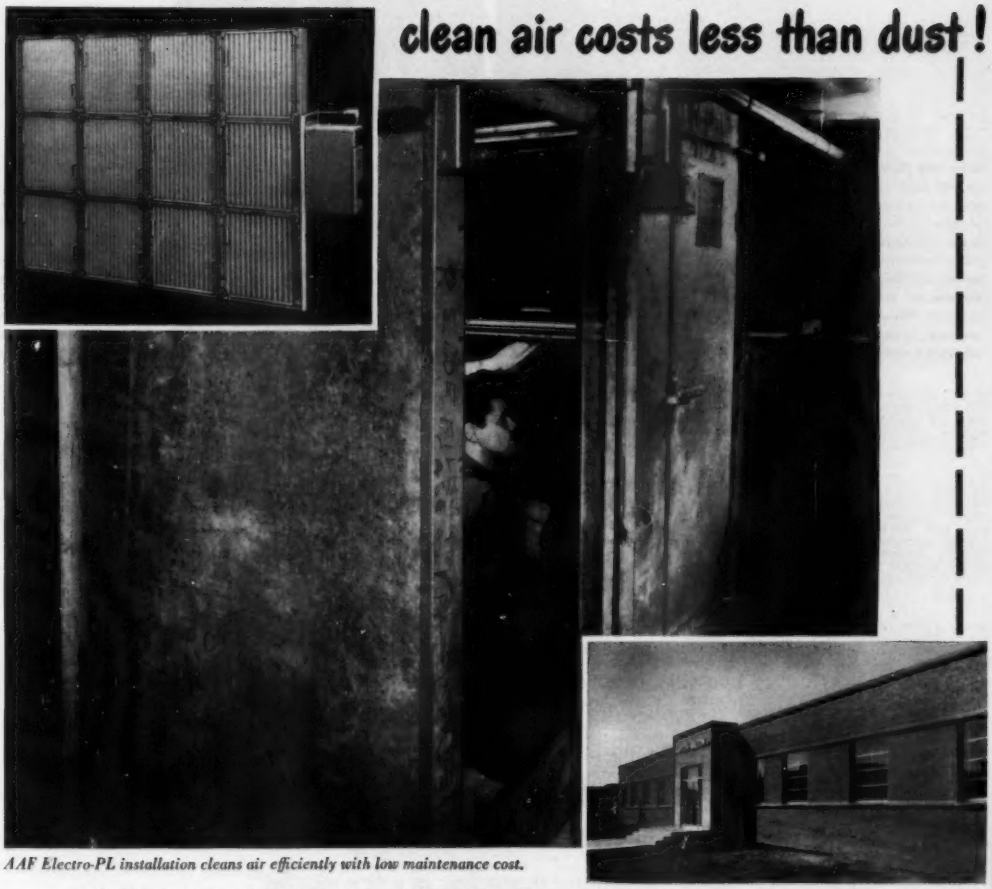
For charging batteries in driver-lead and small driver-ride industrial lift trucks, this new unit accommodates lead-acid batteries of 6-19 cells and nickel-iron-alkaline batteries of 10-30 cells. It's about the size of a tank

type vacuum cleaner with a control box on its side, weighs only 190 lb and can be installed on a shelf 6¾ by 8¼ in.

The charger is easily operated, say company engineers. Just plug it in and set the timer; automatic controls do the rest. Voltage (based on number of battery cells) and current (based

(Continued on page 120)

clean air costs less than dust!



AAF Electro-PL installation cleans air efficiently with low maintenance cost.

SIZE IS NOT A FACTOR

...for a plant to profit by "Clean Air"

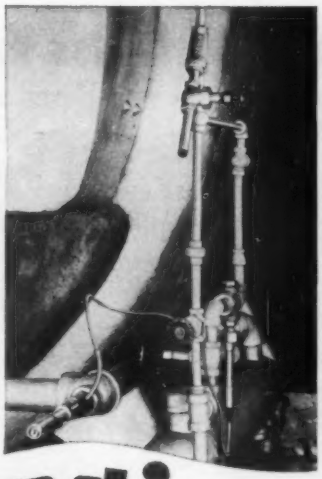
SMALL manufacturer . . . or giant of industry . . . both have found American Air Filters a sound investment. Clean air quickly demonstrates its value by improving efficiency in shop and office. People work better—machines work better—maintenance costs go down.

Let's take a look at the cost of clean air. The AAF Electro-PL installation shown here is a good example. The Electro-PL is a dry-type, electronic air filter of high efficiency . . . with special design features that simplify maintenance. It was selected by Upson-Walton for two reasons: reasonable cost, and performance characteristics that met their special requirements. The Electro-PL is exceptionally versatile in application, as it is available in units for Straight Bank or "V" arrangement to meet almost any space, capacity or cost requirement.

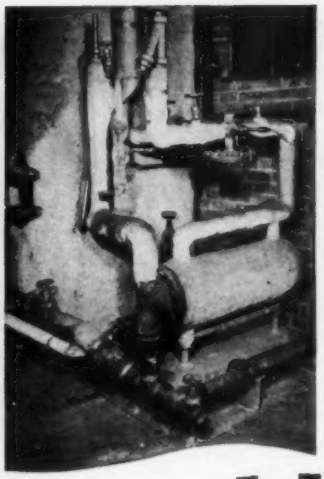
Electro-PL is only one of many types of air cleaning products manufactured by AAF. If you want a correct and economical answer to these questions • How much *clean* air do I need? • How *clean?* • How much will it cost? . . . call your nearby AAF representative or write direct to us.

AAF American Air Filter
COMPANY, INC.

228 Central Ave., Louisville 8, Kentucky • In Canada: Darling Brothers, Ltd., Montreal, P. Q.



Sarco type TR-30 regulator with needle valve supplies just the right amount of steam to the oil preheater to maintain correct oil temperature at the burner, regardless of load changes or intermittent operation. Efficient burner operation is assured, resulting in a saving in fuel.



Sarco type 24-30 Temperature Regulator is pilot-operated and single seated for tight shut off when no water is drawn. The thermostat in the water discharge from the heater responds instantly to load changes and holds the water temperature constant — Never too hot or too cold.

indispensable

IN ANY POWER HOUSE

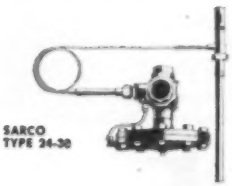
In the industrial steam plant of moderate size, elaborate instrumentation usually is out of reach. However, there are two very common applications for which temperature control really is indispensable; namely, fuel oil preheating, and hot water service. Sarco can do the job with inexpensive

Self-Operated Temperature Regulators

SARCO TYPE TR-30

which will pay for themselves in a few months — often a few weeks.

Thousands of installations, as the examples shown, in every part of the country, testify to Sarco dependability. You set them and forget them. Temperatures are always right.



SARCO TYPE 24-30

Catalog No. 605 lists 12 different styles for heating, cooling and air conditioning; temperatures 0-300°F; valve sizes ¾" to 8". Write for your free copy today.

Sarco can solve your control problem within your budget

sarco

339

SARCO COMPANY, INC., EMPIRE STATE BUILDING, NEW YORK 1, N. Y.

Factory at Bethlehem, Pa. • *Represented in Principal Cities* • Sarco Canada, Ltd., 496 Church Street, Toronto 5, Ontario

(Continued from page 36)

141 Electric Car Pullers—Catalog 100H-06, 8 pp, describes a complete line of electric car pullers, showing many uses for this versatile equipment. Stresses one-man operation of the pullers, shows how they can replace cumbersome and slow handling methods. Capstan, drum and continuous rope pullers are described along with specifications. Selection data and table of track curvature included. American Hoist & Derrick Co.

BOILER ACCESSORIES

142 For All Tube Cleaning—Company's ball-bearing motor and optional cleaning heads for different types of tubes are described and pictured in Bulletin 49. Dimensional data included. The Airetool Mfg. Co.

143 More About Safety Devices—Form SC-1 is company's brand new 20-pp supplemental catalog covering products not listed in condensed catalog issued a few months ago and featuring most widely used safety devices for steam and hot water boilers. The new book presents products for special applications, boiler and make-up water feeders, low water fuel cut-offs, float valves. Contains interesting facts about liquid level controls and related devices, data valuable in solving special boiler water level control, liquid level control and relief valve problems. McDonnell & Miller, Inc.

144 Return Line Treatments — Bulletin 5013 covers causes of return line corrosion and company's corrective treatments — a formula which dissolves in the condensate and reacts with carbon dioxide to prevent carbonic acid, and a new filming type amine formula which forms a continuous film in return lines, coating them against both oxygen and CO_2 corrosion. Includes test procedures for both treatments. Dearborn Chemical Co.

145 Chemical Cleaning — A modern method of removing deposits from internal heating surfaces is described in this 12-pp booklet. Explains chemical cleaning of steam boilers, discussing equipment, solvent and inhibitor used. Also covers chemical cleaning of new boilers to remove mill scale deposits, cleaning of economizers and other equipment. Tells how to prepare boiler for chemical cleaning. Sumco Engineering Co., Sumco Products Inc.

REFRACTORIES, INSULATION

146 Which Refractory?—Form 5120 is a 12-pp illustrated booklet explaining characteristics of several high quality refractories and telling what each is best suited for. Not an ordering book, covers silicon carbide types, electric furnace mullites, electrically fused alumina refractories and fused cast refractories, discussing them from standpoint of heat resistance, heat conductivity, chemical inertness, resistance to abrasion, spalling and thermal shock. Pictures available shapes, includes table of physical properties. The Carborundum Co.

147 One Coat Does It—This small illustrated folder describes an improved finishing cement that insulates. Discusses composition, adhesion and shrinkage characteristics, thermal efficiency, coverage, workability. Baldwin-Hill Co.

PIPING AND VALVES

148 Hangers, Vibration Eliminators — Catalog 51 is a generously illustrated 96-pp collection of application and ordering data on pipe hangers, vibration eliminators and supports. Extremely helpful in writing specifications for this equipment, covers functional hangers, overhead roller assemblies, rigid hanger assemblies, attachments to pipe brackets, tunnel supports, hanger parts. A technical section provides specifications, weights of piping materials, discusses some typical hanger problems and includes thermal expansion and flex-anal charts. Please give title when requesting this book. Power Piping Div., Blaw-Knox Construction Co.

149 Insulation for Piping—"Foamglas Insulation for Piping and Process Equipment" is a 24-pp illustrated booklet discussing advantages of Foamglas. Lists properties; gives typical data for cold, intermediate and hot applications; details for insulating tanks, ducts, removable covers and tank heads, accessory materials. Tables of special value are those showing sizes and shapes available in pipe insulation, standard blocks, beveled lags and standard curved segments, also recommended shapes and thicknesses. Pittsburgh Corning Corp.

150 Low Pressure Coupling—Bulletin 514 illustrates and describes manufacturer's low pressure Wedge-Lock coupling, a one-piece positive type, for connecting light-weight pipe in ventilating and similar low pressure service. Includes complete specifications on pipe sizes from 3 to 30 in. dia. Pictures simplicity of use. Naylor Pipe Co.

151 Valves, Specialties—Six-pp Bulletin W-350-B50 describes and illustrates gate and needle valves, flanges, hose nipple, bars, welding electrodes and screw machine products manufactured of company's Worthite. Lists corrosive solutions Worthite valves are designed to handle. Worthington Pump and Machinery Corp.

152 Revised Valve Data—Important revisions in manufacturer's Catalog 100-4 on air control valves are available. These affect light-duty 2-position 4-way valves and 3-way valves and poppet-type hand control valves. The revised pages provide up-to-date engineering data, information, illustrations and dimensional drawings on additional models plus changes in model numbers. Logansport Machine Co., Inc.

TRAPS AND PURIFIERS

153 Trap Data—Here's 12-pp condensed catalog giving information and prices on company's steam and air traps. Lists cast semi-steel and forged steel inverted bucket traps, compound steam traps, ball float air traps, Y-type strainers and internal check valves. Provides data on calculation of condensate loads and selection of traps to handle these loads, also a full-page capacity chart. A parts list is included for cast semi-steel and forged steel inverted bucket traps. Armstrong Machine Works.

154 Steam, Air and Gasoline Traps—Catalog 751, 32 pp, is a recently issued 32-pp ordering book on traps. Fully illustrated and complete with capacity tables, installation diagrams and a section containing data, charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps for pressure to 225 lb; expansion steam traps for pressures to 250 lb; weight-operated traps for steam, air, gasoline, pressures to 1500 lb; piston-operated steam traps for pressures to 650 lb; also separators. W. H. Nicholson & Co.

155 Improved Vapor Purifier—An internal type purifier designed to remove virtually all entrainment from vapor is described in Condensed Bulletin 100. Advantages described include delivery of vapor with 1 ppm or less of total solids, low initial cost, elimination of baffling, self cleaning action, low pressure drop. Cutaway drawing shows flow of vapor through the unit, tabel of dimensions, specifications, explanation of how unit operates. The V. D. Anderson Co.

156 Purifier Catalog—Illustrated and described in Bulletin G-51 are nine types of purifiers for entrainment separation in air, steam, vapor and gas applications. Also described is company's methods of employing centrifugal and centripetal forces to obtain highest separate efficiency without moving parts or mechanical filters. The Centrifix Corp.

MACHINE SHOP AND WELDING EQUIPMENT

157 Welding Accessories—Bulletin 101 on arc welding accessories, illustrates and describes features and advantages of company's cable connectors, electrode holders and terminal connections. Cam-Lok Div., Empire Products, Inc.

158 Grinders and Arbors—This 8-pp illustrated catalog provides information on a complete line of ball bearing bench grinders, arbors, sanding discs and face plates. Included are specifications, dimensional diagrams and application suggestions for using the saw and adapter arbors to build a wide variety of special production tools. Poly Products.

159 For Coolant Filtration—This illustrated bulletin announces a small but powerful magnetic filter for coolant and cutting oils. Tells how filter works, describes special features. Also discusses value of clean oils in term of lowered rejection rates and reduced downtime. Three installations shown. Bonan-Crane Corp.

METALS

160 Selection Guide for Engineering Irons—This new 28-pp basic reference booklet presents the many valuable characteristics of modern nickel cast irons. Fifty illustrations show wide industrial usage in all sizes and shapes, and 27 tables, charts and microphotos show how through the use of nickel, alone or in combination with other alloying elements, the engineering properties of cast iron can be controlled to meet almost any service requirements. Covers fully the mechanical and physical properties of modern alloyed irons. Includes specifications for typical applications. The International Nickel Co., Inc.

161 Using Alloy Steel Tubing — Assistance in solving problems involving use of

September, 1951

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PLANT ENGINEERING

Please have manufacturers send without obligation information or bulletins indicated by following numbers.

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low carbon, or carburizing grades of tubing steels is offered in Bulletin TDC 149. Presents condensed data on microstructure, critical points, effect of alloy elements, forging, machining, welding and thermal treatment for 14 well-known alloy steels used in the production of tubular parts. The Babcock & Wilcox Tube Co.

162 Copper Clad Metal—Form E100 gives properties, applications and advantages of a copper clad metal formed with base metal of low carbon magnetic steel metallurgically bonded with rolled copper. Stresses strength of this copper-saving metal, its lighter weight, improved electromatic shielding action. American Cladmetals Co.

163 Stainless Croloys—A 106-pp pocket-size handbook with flexible leatherette binding, Bulletin 1-B is devoted to properties and methods of working seamless and welded tubes and pipe of company's stainless croloys. Data provided includes analyses of austenitic and ferritic stainless croloys, corrosion and oxidation resistance, methods of working and fabrication, also mechanical, physical properties and other information on various croloys. Available to qualified plant engineers, please state title when requesting this booklet. The Babcock & Wilcox Tube Co.

SAFETY

164 Easy Breathing Respirator—Illustrated Bulletin CR-28 provides 2 pp of information on a new compact respirator with improved filter and offering much less breathing resistance than previous models with same dust collecting efficiency. Includes details of construction. Mine Safety Appliances Co.

165 Electrical Properties of Rope—This 8-pp booklet stresses safety advantages of manufacturer's manila rope specially treated and processed to make it more shock resistant and safer for use around high tension lines, etc. Presents electrical properties of this rope, of manila rope waterproofed by other methods and of non-waterproofed rope. Also gives water absorption test results. South Eastern Cordage.

REFRIGERATION, VENTILATION

166 Improved Concentrator—Illustrated Bulletin 118, 2 pp, presents Series 6600 of company's improved No-Frost concentrator, offering 15 to 36 gph capacities and designed to handle large live loads quickly. Pictures six installations of the concentrator. Niagara Blower Co.

167 Cooling Tips—Form 131, 12 pp, presents cooling and ventilating units for industrial plants, commercial buildings. Stresses maximum cooling, other benefits offered, includes tips on selection and planning. Illustrates 12 installations. American Coolair Corp.

FOR MORE PRODUCTION WITH FEWER HEADACHES

168 The Why of Foremen Training—A 6-pp report on what foremen training can mean to production and profits, this booklet explains why plant engineers should consider foreman training, what it can do, how it can pay for itself, advantages of training offered by this company, and how training service is rendered. Lester B. Knight & Associates, Inc.

169 CMP Record Keeping—The answers to many record keeping problems arising under Controlled Materials Plan are described in Booklet X-1203, a collection of data sheets in filing binder. This practical manual outlines methods for simplifying paper work by laying the groundwork for getting the desired result, a properly balanced and interrupted flow of materials to meet requirements on schedule. It shows ways to save on clerical routine, as well as incorporating information necessary for the correct set-up of records required for efficient operation under CMP regulations. Management Controls Div., Remington Rand Inc.

170 With the Facts in View—An efficient, visual control of production, scheduling and engineering inventory is presented in 4-pp Bulletin 136-3, "Look at the Facts Instead of for Them." Shows how visual control boards may be used to visualize operating effectiveness at a glance at any hour of any day. Examples of typical applications are given. Visi-Trol Corp.

171 How Summary Cards Can Help—Featuring a two-in-one machine for producing punched card reports and summary cards, this 6-pp bulletin tells how summary cards can speed reports, serve as a basis for additional accounting applications, reduce clerical help, etc. Illustrates a detail card, also weekly listings of gross pay summary cards, labor distribution cards. Remington Rand Inc.

172 More Mouths to Feed?—Plants providing food service on the premises can find out how their food service stacks up against that provided by other companies from a 40-pp booklet, "Feeding the Factory Worker." Based on a survey of 240 plants using different methods, it shows advantages of decentralized systems, such as food carts, canteens and vending machines in bringing food to the worker and accommodating fluctuations in payroll. Field Research Div., Paper Cup and Container Institute, Inc.

LABORATORY EQUIPMENT

173 New Apparatus—Twelve-pp edition 13 of "What's New for the Laboratory" pictures and describes company's recently introduced constant temperature water bath, vertical autoclaves, a one-pan balance not requiring attachment of weights, flexible heating tape, a spray which reduces air-borne bacteria while eradicating odors, an electronic temperature controller. Scientific Glass Apparatus Co.

174 New Microscopes—Illustrated Catalog D-185, 24 pp, introduces company's new Dynoptic Labroscopes featuring ease of adjustment. Design improvements are explained and pictured. Three series of these microscopes are presented with specifications of most frequently ordered models, showing how by assembling various components, the exact instrument required can be had within budget limits. Price list included. Bausch & Lomb Optical Co.

OTHER EQUIPMENT

175 Heating Equipment and Systems—Sixty-pp Catalog G-39 presents not only up-to-date ordering information on company's heaters and hot water heating specialties, but also design tables and engineering data for venturi systems, two-pipe reverse return systems, panel heating systems, snow melting systems. Also contains a parts list and section on servicing of circulators, valves, flow checks. An added feature is a double-page check chart providing basic remedies for common hot water heating and indirect water heater complaints. Taco Heaters, Inc.

176 Turbine Oil Conditioning—Twelve-pp Bulletin 532-P, 12 pp, describes and illustrates dry-type oil maintenance methods for bearings of modern turbines. The importance of continuous oil maintenance, and the factors which cause turbine oil deterioration are fully explained by charts, diagrams and phantom views. Various maintenance systems are shown with their capacities and dimensions. Also presented is a system for maintaining insulating oil dielectric in transformers, circuit breakers and switches. Bowser, Inc.

177 Engine Starting Motors—Two new air cranking motors for starting service on diesel and gasoline engines with piston replacements to more than 3500 cu in. are introduced in 8-pp illustrated Form 5004. Data provided includes specifications, dimensions, recommended throttle and lubrication arrangements and an air cranking motor selection list covering 15 leading makes of engines. Ingersoll-Rand.

178 Governor Efficiency Explained—"How to Get the Most Out of Your Governor" is a 12-pp up-to-date presentation of centrifugal governor problems and applications. Illustrated with photos, schematic drawings and charts, describes operation of governing mechanisms and explains governor weight energies and calibrations. Includes discussions on valve boxes, shafts and linkages; positioning of governor levers and geometry of connections; causes and effects of engine condition on governor efficiency. Details on adjustment, care and maintenance included. The Pierce Governor Co., Inc.

179 Cathodic Protection Slide Rule—Designed to assist plant engineers concerned with cathodic protection of pipelines is this magnesium anode cathodic protection guide. With pipe size and resistivity known, the slide rule gives required magnesium anode size and life, length of pipe protected, and current output. Please give title when requesting slide rule. Federated Metals Div., American Smelting and Refining Co.

180 Fine Coal Dryer—An improved dryer for fine coal is announced in 8-pp Bulletin 551. Gives a detailed description of the Pulso unit, a thermal dryer of the up-draft type. A complete installation is illustrated along with an operational diagram showing the complete flow of the coal and hot gases. Temperature and gas flow controls are pictured and a complete engineering drawing of a final coal drying arrangement is included. McNally Pittsburg Mfg. Corp.

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Gate, Check, Globe and Y Valves, in Bronze, Iron, Steel and Corrosion-Resisting Metals and Alloys

Fig. 375. Small 200-pound Bronze Gate Valve with renewable, wear-resisting "Powellium" nickel-bronze disc.

★ *Quality fine throughout "The Line"* ★

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

(Continued from page 114)

on ampere-hour battery ratings) are adjustable.

Enclosed construction protects against external damage; but control parts, commutator and brushes are accessible. The single-circuit equipment operates on 3-phase, 60-cycle a-c power and has generator- and motor-overload protection. Small and Medium Motor Divs., General Electric Co., Schenectady 5, N. Y.

CONVEYOR TRANSFER

Solves "dip" problem by lifting load from line temporarily

Suggested as a means of overcoming the "no short vertical turn" obstacle presented by most overhead track conveyor installations is this work processing transfer. With it, work is automatically lifted off the line for processing operations. Manufacturer says the transfer can be applied to any chain or cable type of conveyor, or even belt conveyors.

The transfer consists of work carriers of any desired shape supported by load bars, which are in turn supported by the conveyor. At point of processing the carrier is automatically, and without separately moving parts, lifted off the load bar and onto an independently supported section which is raised or lowered vertically, or at any angle required, for paint dipping, degreasing.

When work is completed, carrier can be moved back onto the same conveyor, to another one, or otherwise dispatched. Operations can be performed entirely automatically or partly manually, company says, adding that in the case of dipping jobs the long tank needed for long vertical turns can be replaced by a shorter one. Illustrated bulletin available. Shuler Conveyors, Inc., 43 Hutcheson Pl., Lynbrook, N. Y.

SPACEMASTER
ELECTRIC FORK TRUCK
new "61"
HEAVY DUTY
HIGH SPEED
WAREHOUSE TRUCK
3000 LBS. Cap. up to 48" ld. lgths. (4000 LBS. up to 32" for transporting) 127" lift Turning Radius 61"
Minimum Aisles
Greater Lateral Stability
No Grease Points
Less Down Time
Faster Lift
Greater Safety
Center Point
Full Vision Drive Permits
TRAILING LOAD
(Latest Gov't. & Industry Safety Regulations)
WRITE for Bulletin "61"

LEWIS-SHEPARD The MASTER Line
LEWIS-SHEPARD PRODUCTS INC., 162 WALNUT ST., WATERTOWN, 72, MASS.
Midwest Plant CRAWFORDSVILLE, INDIANA

BASIC SWITCHES

High capacity, feature rigid lever actuation, low operating force

Demand for a high capacity basic switch requiring a lower operating force than that offered by flexible-leaf actuated switches has resulted in the addition of the new V Series to company's Type A Basic Switches. The rigid lever actuators are located in the same positions as those of the other precision snap-action switches in the Type A line and there is a choice of

a long straight lever, a short lever with roller and the long lever with roller pictured.

These switches are listed for ¾ hp, 115 v, a-c; 1½ hp, 230 v, a-c; 20 amp 125, 250 or 460 v, a-c; 10 amp 125 v a-c "L" (suitable for controlling tungsten filament lamp loads on a-c circuits). Three types of terminals are available; solder lugs, integral screw terminals and side facing binder head screw terminals. Write for revised data sheet. Micro Switch, Freeport, Ill.

RING PACKING

Molded type, each ring is self-contained packing unit

A new automatic ring packing, Uneepac is designed for maximum sealing efficiency in minimum packing depth so stuffing box sizes can be reduced. Each ring centers itself perfectly on the preceding ring, company explains, and this reduces the chance of human error. In service, each lip is always exposed to fluid pressure and this provides instantly responsive sealing. Uneepac is offered in various compositions for water, steam, oil, air, gas, vacuum, other services. It is furnished in sets of endless or split rings and available for shafts ⅝ in. dia and up. Johns-Manville, 22 E. 40th St., New York, N. Y.

STEAM GENERATOR

Offers low installation cost, automatic operation, fast steaming

The Model 4740 Steam Generator widely used to supply high-pressure dry steam to heat diesel powered passenger trains, is now being used to supply processing steam to operate laundries, to supply 600 lb pressure steam for melting parrafin in pipes from portable

"Tycol Anorustols prevent rust... protect all metals... clean off easily"

That's true! Tycol Anorustols form protective coatings—keep moisture and oxygen from attacking metal surfaces. They are easily applied by swab, dip or spray. Various consistencies and types of Anorustols are available to meet every condition where "rust protection" is needed.

For complete information about Tycol "rust protection" phone or write your nearest Tide Water Associated office today.

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Keller Hoist handles ladles of hot iron in a foundry

KELLER AIR HOIST for LOW MAINTENANCE

There is so little to go wrong with an air motor that Keller Air Hoists are establishing remarkable records for low-cost maintenance. For example, an air motor will not burn out when overloaded. It is uninjured by prolonged stalling.

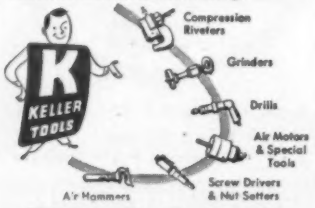
That is one of the reasons why Keller Air Hoists are preferred over other types for hundreds of industrial uses.

Other reasons include light weight (30 lb*), small size (5″ x 5″ x 15″*), accurate control (speed variable from a creep to 17fpm*), and safety. *For 1000-lb Hoist. Capacities of 300 and 2000 lb also available.

Air Hose Trolley

Keeps air hose conveniently suspended, permitting it to follow a trolley-suspended Keller Air Hoist.

Keller Air Hoists, Hoist Trolleys, and Hose Trolleys are available through Keller sales offices, or direct from the factory.



KELLER

Pneumatic Tools

KELLER TOOL CO., GRAND HAVEN, MICH.

rigs for distilling sea water and for a wide range of other applications.

For its size and weight this unit is a powerful steam generator, manufacturer points out; it develops 200 lb of steam in 2 min from 50 F water and produces 4800 lb of 99 per cent dry steam per hour. It uses No. 2 fuel oil and in operation the hot gases produced wipe over the 702 ft of steel coil, turning water pumped through the coil into steam. One electric motor (gasoline engine or portable units) drives the water pump, fuel pump, blower and magneto. Once the switch is turned the automatic controls take over and cause the machine to turn on and off as needed.

Besides its other advantages this generator offers increased safety, company says. It can't blow up because no reservoir of water is heated under pressure. Vapor Heating Corp., 4501 W. 16th St., Chicago, Ill.

FLOOR CLEANER

For all floorings, is fast acting, deodorizes as it cleans

Besides being safe for all floors, Emerel is also suggested for washable walls and woodwork, and it's said to loosen the dirt, grime and floor stains without scrubbing. It contains no harsh chemicals, abrasives, free alkali or harmful acids, according to manufacturer. Formulated as a concentrate, Emerel is mixed in a ratio of 1 to 20 and may be used with either hot or cold water.

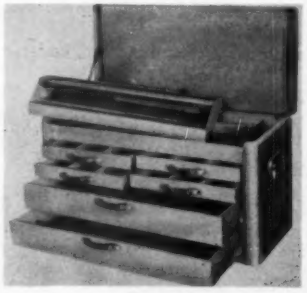
The new product was especially formulated to eliminate the scrubbing formerly needed to properly clean terrazzo, marble, ceramic and vitreous tiles; it may also be used on rubber and asphalt tiles, plastic floors. Because it contains no free alkali it's not necessary to rinse or neutralize floor surface after using, company points out. It comes in 1- and 5-gal cans, 55-gal drums. S. C. Johnson & Son, Inc., Racine, Wis.

MASTER TOOL CHEST

Of heavy gage steel, has six drawers and partitioned top section

Proto Tool Chest 9997 is 27 by 12 by 15 in. high and features welded construction, double-walled sides, double-reinforced top and bottom, and rounded corners. The top is supported on a full-length piano-type hinge.

Drawers have dual-action slides, and slide stops to prevent drawer spilling.



Two of the drawers are full-width, 2¾ in. deep two-compartment type, and four are half width, 1¼ in. deep three-compartment drawers. A full width top section is partitioned into

LIKE AN ATOM-IC EXPLOSION

Just ONE 1/32" pin-hole size faucet LEAK MUSHROOMS into ATOMIC WASTE of approximately 76,000 gallons of water yearly—COSTING: $1013 @ $1 per M cubic foot

If a hot water faucet, then actual FUEL WASTED heating 76,000 gallons costs approximately:

$27.65 if coal (7,900 lbs.)
$38.00 if oil (633 gals.)
$50.63 if gas (67,500 cu. ft.)

STOP this needless WASTE during today's MATERIAL and MANPOWER shortages with 'SEXAUER' "Easy-Tites" that outwear ordinary faucet washers 6-to-1, thus SAVING labor on 5 REPEAT repairs, PLUS water and fuel, while prolonging the life of SCARCE fixtures.

PAT'D.

"EASY-TITE" FAUCET WASHERS

...a modern laboratory triumph, are compounded from du PONT NEOPRENE instead of rubber—to withstand DESTRUCTIVE HEAT common in present-day super-heating water systems—that formerly broke down washer's structure (tested to withstand 300°F.).

Built like a tire with fabric re-inforcement they resist the grinding, closing squeeze that SPLIT and MUSH ordinary washers out of shape... causing LEAKS.

Through combining NEOPRENE and FABRIC RE-INFORCEMENT they OUTWEAR ordinary washers 6-to-1 on hot or cold TAPS—thus you slash water fuel and labor costs.

THE NEW 'SEXAUER' CATALOG

Edition F, just out pictures over 2500 TRIPLE-WEAR plumbing REPAIR parts and Pat'd. Precision Tools. It's today's accepted buying guide for discriminating purchasing and maintenance personnel among thousands of top PLANTS, INSTITUTIONS and GOVT. AGENCIES that rely on SEXAUER repair materials. *Send for your copy today!*

Then too, there's a SEXAUER TECHNICIAN within quick call from coast-to-coast, who offers a special SURVEY service that sets up a schedule of the exact replacement parts required for your particular plumbing fixture regardless of make or age and *without obligation.*

A postcard will bring him and your NEW Catalog F promptly.

J. A. SEXAUER MFG. CO., INC., Dept. 591
2563-65 Third Avenue, New York 51.

SEXAUER

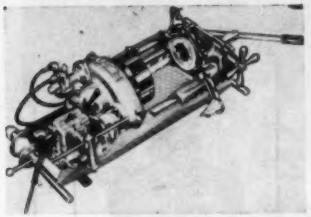
as advertised in THE SATURDAY EVENING POST

three compartments. Chest is fitted with tumbler lock, side handles. Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles, Calif.

SMALL PIPE MACHINE

Is equipped with safety switch lock for added protection

This is company's well-known Model E, lightweight, economy machine, and the addition of the safety switch lock gives it the same safety advantages



of company's larger and more expensive models. The Power Units C1 and C2 are also protected with safety switch locks.

This device is intended to protect both men and machine against possible injury. It is designed to work automatically, to make it impossible to start the machine unless the chuck wrench has been removed from the chuck and placed in its holder. This feature replaces the old-style "wrench ejector" that ejected only special types of wrenches. Now, no special wrench is required. Special bulletin available. Beaver Pipe Tools, Inc., Warren, O.

NOISELESS AIR VIBRATOR

"Air-cushioned" piston action; offers variable speed, intensity

In the Type AC Vibrator the reciprocating action of a hard chrome-plated piston develops the vibrating action. This action is noiseless, company explains, because the momentum set up by the piston is cushioned by a pocket of air at each end of the vibrator assembly.

The AC is described as ideal for use where vibrating equipment must be located near employees and is suggested for bunkers, bins and chutes for coal, powdered chemicals and similar materials to keep them from sticking, arching or rat-holing. The AC weighs 2 lb 11 oz, is 6½ in. long, 1½ in. wide. The Cleveland Vibrator Co., 2816 Clinton Ave., Cleveland, O.

ELECTRICAL TAPE

Made with Koroseal material, features non transferring adhesive

This tape can be pressed onto a dry surface innumerable times without losing its stickiness because the adhesive is non-transferring. It is also said to stick snugly and securely to itself and to insulation around copper wire. Dielectric strength of the tape is given as 8000 v. It is flameproof and waterproof, according to manufacturer, and resistant to abrasion, acids, oil, alkalies and corrosive salts. Easily used, this electrical tape stretches and conforms to irregular surfaces.

Because it is extra thin it takes up less room in junction boxes. It's packaged in rolls 60 ft long and is ¾ in.

A WONDERFUL NEW PRODUCT THAT COMPLETELY

ENDS BELT SLIPPAGE

AN ENTIRELY NEW CONCEPT IN BELT DRESSING

Chesterton Belt-Flo is a new liquid belt dressing that contains neither rosin nor asphalt. It will not pick up dust or dirt. It will increase transmitted horsepower up to 50%! It never builds up on belts.

"Belt-Flo" holds its power because it does not harden. Is applied to running belts through applicator spout. Colorless — Nontoxic.

"Belt-Flo" ideal for use on Leather, Rubber or V Belts.

Carried by all leading Industrial Supply Jobbers. Order today and experience an entirely new concept in belt dressing that ends belt slippage . . . for ever!

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SLY

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DUST CONTROL

A typical Sly dust control installation in a cement plant. Hundreds of Sly Dust Filters in cement plants collect dust generated in such operations as crushing, grinding, screening, conveying, loading and packing—Saving valuable materials, adding to net income.

Your Dust Problem Solved

- **EFFECTIVELY—**
- **INEXPENSIVELY**

We've found that people often *endure* dust for years before they investigate and find out how effectively and inexpensively dust can be controlled.

In this business of dust control—like many others—experience is the best teacher. We have been learning for 50 years—and still are.

With thousands of installations, we have a wealth of experience in all industries. We'd like to share this wealth by discussing your particular problem with you. Sly representatives are trained and experienced engineers.

There's no obligation involved. You may be agreeably surprised at how *effectively* and *inexpensively* your dust problem can be solved. Ask for Bulletin 98.

THE W. W. SLY MANUFACTURING CO.

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wide, 0.0007 in. thick. Each roll comes in a metal container and a special shop carton holds 12 containers. The B. F. Goodrich Co., Akron, O.

THERMOSTATS

Expanding-tube; in conduction, convection, immersion models

This new Saico Thermostat utilizes a stainless steel tube as the expanding member and an Invar strip as the non-expanding member. An Inconel spring is used to provide fast make and break action. There is a Duronze adjusting screw for setting of control point at any temperature to 600 F, and massive silver contacts are used to provide two breaks in series.

Series 12 of these new thermostats is ½ in. dia 2-3/32 in. long for 600 w loads at 110 v, or 230 v a-c or d-c and sensitivity is given as 0.2 F on 1 amp loads. Series 58 is ⅝ in. dia, 3 in. long for 1000 w loads at 110 or 230 v a-c or d-c, sensitivity 1 F. Smith Control & Instrument Corp., Palmyra, N. Y.

CENTRIFUGAL TACHOMETER

Manufactured in Germany, is again available in this country

This is the popular Dr. Horn centrifugal hand tachometer, unavailable during the past several years when Dr. Horn's plant in Germany was out of commission. The present model is basically the same as offered previously. It has six ranges covering 25 to 30,000 rpm in one instrument; is protected against damage from overspeeding; is simply constructed and requires minimum maintenance. It is described as a sturdy instrument capable of long, dependable service and moderately priced for a multi-range tachometer. For more information on this speed measuring instrument ask for Bulletin 36-65-25. James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

UNIVERSAL TESTER

Features higher top range, improved drive and solid shaft

New design improvements in this manufacturer's Low Range Tester include an 0 to 300 lb scale for testing heavier materials. Top range of previous model was 0 to 100 lb. The new motor drive is intended to assure full torque up to 300 lb direct loading and with stepless speed control to 20 in. per min. W. C. Dillon & Co., Inc., 1421 S. Circle Ave., Forest Park, Ill.

HARD OVERLAY ELECTRODE

For a-c d-c arc welding, is developed to resist abrasion, friction

EuteChrom 2X is a FrigidArc flux-coated alloy suggested for all-around use where a relatively inexpensive hard overlay electrode is required and when higher priced high alloy overlays do not seem warranted. It deposits strong,

Protect your closed process vessels for as little as $5.00

WITH THE HONEYWELL VACUUM BREAKER

The discharge of fluid from closed vessels sometimes becomes so rapid that the pressure differential between outside and inside causes collapse. The Honeywell Vacuum Breaker prevents such costly damage by automatically permitting air to enter, keeping the vacuum within safe limits . . . cheap insurance considering the cost of a half inch size is less than $5.00.

Sizes ½" to 3" . . . screwed connections . . . spring loaded construction. Made of bronze throughout. Vacuum adjustable from 2 to 24 inches of mercury. Relief Capacity from 3.7 cu. ft. of air per minute for ½ inch size, to 720 cu. ft. per minute for 3 inch size.

Prompt shipment from stock. Prices: ½"-$4; ¾"-$5; 1"-$6; 1¼"-$17; 1½"-$18; 2"-$20; 2½"-$25; 3"-$38. Order today!

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1901 Windrim Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

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CORRECT CHARGING
EXTENDS BATTERY PERFORMANCE!

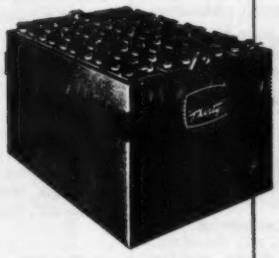
Right now, the problem of conserving and extending essential battery power is urgent. Timely help is offered you by the GOULD PLUS-PERFORMANCE PLAN which can improve battery performance as much as 50%! Here is a complete system of manuals, articles, specifications, bulletins, record cards and charts which explains and illustrates how to select, charge and handle, maintain and determine the condition of your batteries.

The material comprising the GOULD PLUS-PERFORMANCE PLAN is available to battery users without obligation. A request on your letterhead will bring descriptive literature by return mail.

Charging rooms should be planned to make charging and handling convenient and economical.

FOUR SIMPLE CHARGING RULES SAVE POWER

1. Do not overcharge. Use 22.5 amperes per 100 ampere-hours of battery capacity for 80% of charging time. Finish charge at 5 amperes per 100 ampere-hours. Correct charging will not cause gassing or overheating.
2. Give periodic equalizing charges. An extra 4-hour charge at the recommended finish rate at least once a month but not more often than once a week makes sure all cells are up to full charge.
3. Keep idle batteries charged. Batteries not in use should be given a freshening charge once every three months to prevent internal discharge, sulphating and eventual loss of efficiency.
4. Inspect charging equipment regularly. Make sure it is set correctly for the size of batteries to be charged. Inspect voltage relay timers frequently to assure accurate automatic cut-off. If ampere-hour method is used, check ampere-hour meter charts for correct settings.



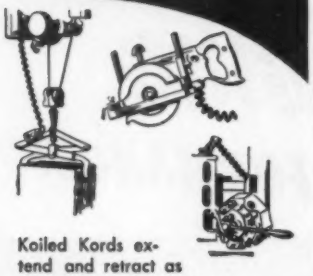
The Gould "Thirty" with "Z" Plates—America's Finest Industrial Truck Battery

GOULD STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

PUT *Koiled Kords* ON MACHINES THAT MOVE



Koiled Kords extend and retract as the machine or part moves. There's no dangling, hanging cord to catch, tangle and break. Koiled Kords cut replacements to a minimum and eliminate many hazards. For efficiency, economy and safety use Koiled Kords.

Write on your business stationery for a sample of Koiled Kord with from one to six conductors.

Where straight cords are safe and efficient use **DYNAPRENE** Flexible Cord, the extra tough cord that provides extra life under all operating conditions.

Write for descriptive DYNAPRENE Bulletin.

Be sure to specify Whitney Blake type SO or SJO for your flexible cord needs.

Koiled Kords

BOX K, NEW HAVEN 14, CONN.

Canadian Koiled Kords Distributor: R. D. Fleck & Co., Ltd., Oshawa, Ont.

dense overlays with good corrosion resistance at lower amperages, company states, thus minimizing distortion.

Manufacturer of EuteChrom 2X recommends it for use with carbon and alloy steel surfaces subjected to severe abrasive wear and comparatively mild impact. It is available in ⅛, 5/32, ¼ and 3/16 in. dia. Specifications and prices on request. Dept. P, Eutetic Welding Alloys Corp., 172nd St. and Northern Blvd., Flushing 58, N. Y.

NEW PUMPS

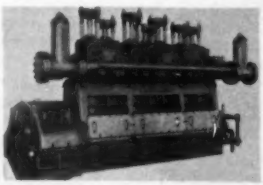
For varied plant services, large, small pumping jobs

GENERAL PURPOSE centrifugal pumps suited to any small pumping application, the new Type SCC pumps are light in weight, easy to install and mount. These close-coupled pumps operate at 3450 rpm, offer capacities to 100 gpm at heads to 120 ft. Standard mounting is vertical, but pumps can be adapted for horizontal mounting. Company recommends them for cooling towers, hot water heating systems, booster and process pumping. Further information given in Catalog D851. Economy Pumps, Inc., Hamilton-Thomas Corp., Hamilton, O.

MULTI-STAGE opposed impeller pumps recently added to company's Opeller line include 4-, 6- and 8-stage units and for services to 1000 gpm and 1200 psi for temperatures to 350 to 400 F.

They are suggested for boiler feed service, oil refinery services for liquids from propane to strong caustic, also general water service. Literature available from manufacturer. DeLaval Steam Turbine Co., Trenton 2, N. J.

DIRECT FLOW pumps ranging from 300 to 900 hp are now available in 3-, 5-, 7- and 9-plunger units, for chemical handling,



heavy forging press service, water injection, steel mill descaling. They have 6-in. stroke, operate at crankshaft speeds to 300 rpm and are suitable for direct drive by engine or synchronous engine-type motor. More details about them in Data Sheet 67-A. The Aldrich Pump Co., Allentown. Pa.

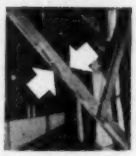
DRAFTS?

New Low Cost Method

- **STOPS DRAFTS!**
- **REDUCES HEAT LOSSES!**
- **IMPROVES WORKERS' COMFORT!**

ENORMOUS SUMS of fuel money fly out the window through easily-repaired drafty cracks. Ayerst, McKenna and Harrison Ltd., leading producers of pharmaceuticals and biologicals, of Ville St. Laurent, Quebec, greatly reduced heat losses through this unique method of draft control.

Any average mechanic or maintenance man can equal this success following the Tremco Man's analytical approach to such problems. In this case a mastic bead, laid along the ventilator, was covered with oil paper. The ventilator was then closed sharply to create its own tight fit.



This demonstration took place in a corner room having cross ventilation where drafts were particularly noticeable. The treatment resulted in a rapid rise of temperature in this area. Application of this method to all of the windows in the plant reduced drafts to a marked degree and *greatly increased the comfort of the workers.*

It's not too early to get your sash ready for winter. Let the Tremco Man help you find low cost effective means for reglazing, caulking and painting your sash. Write The Tremco Manufacturing Co., Cleveland, Ohio.

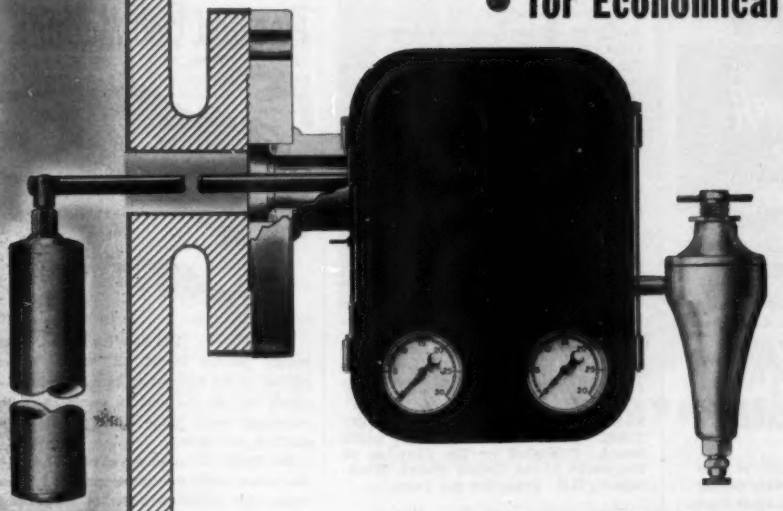
TREMCO

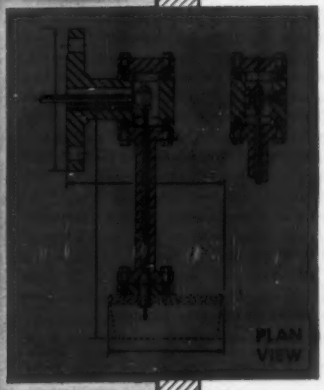
PRODUCTS AND METHODS FOR BUILDING MAINTENANCE

UM-1090

The NEW BS&B "Climax" LIQUID LEVEL CONTROLLER

Internal Side-Flange Mounted
- for Corrosive Conditions
- for Economical Installation





Here's a level controller designed for mounting on a flanged vessel nozzle with the displacement element operating within the vessel itself. It offers a *more economical* installation than an external mounting. Use the new Type 889 where external cage mountings are impractical due to clogging or vapor-locking of equalizing lines.

Torque tube, tube assembly, connecting parts, pilot and regulator are same as the famed new BS&B "Climax" Type 888. Standard size available in 4" ASA flange series. Larger flanges or special connections available on request.

Displacement elements up to 120 inches can be furnished. Write today for new catalog, specifications, prices.

BLACK, SIVALLS & BRYSON, INC.
Climax Controls Division
Adv. Dept. Rm. 54P 7502 East 12th Street
Kansas City 3, Missouri

BS&B

"Climax" Type 889
INTERNAL SIDE-FLANGE MOUNTED
LIQUID LEVEL CONTROLLER

Set Studs into Steel or Concrete in seconds

← STEEL TO CONCRETE

with the

VELOCITY-POWER DRIVER

Better 3 Ways!

1. IT'S SIMPLE

One-handed operation. Load—position—fire. Stud imbedded—job done. Two basic parts—barrel and firing unit—easy to service. Integral cartridge bans matching and fitting—ready to use.

2. IT'S VERSATILE

Drives studs easily into steel or concrete. Interchangeable barrels permit driving of either ¼ or ⅜-in. studs from same firing unit. Wide range of studs available—solid head, internal or external threaded types.

3. IT'S SAFE

Center-fire cartridges plus spring-loaded safety arm that must be rotated 180 degrees and held before stud can be fired makes accidental discharge impossible. Barrel design and long bearing area of piston avoids ricochet, flash, recoil. Cartridge assemblies assure right load for the job. Write for Bulletin No. TA-17.

DEALERS WANTED

Big, profitable sales opportunity in a broad market with this time, labor and money saving tool for maintenance, repair and construction work. Cartridge-studs bring repeat business. Act now!

VELOCITY POWER TOOL CO.

7505 Thomas Boulevard

Pittsburgh 8, Pa.

NEW BOOKS

for the plant engineer

For Better Industrial Relations

INDUSTRIAL RELATIONS HANDBOOK. Edited by John C. Aspley and Eugene Whitmore. Third Edition; size 5 by 7¾ in.; 1244 pp, including bibliography and index; leatherette binding. Published by The Dartnell Corp., 4660 Ravenswood Ave., Chicago 40, Ill. Price $10.00.

IN THIS HANDBOOK are a thousand-and-one answers to your employee relations problems. Beginning with the first chapter about Industrial Relations Today and going through the fifty-sixth chapter on Relations with Government, many of the questions you may have regarding industrial relations are explained.

Some of the chapter headings are listed to give an idea of the material covered: negotiating a labor contract; seniority problems; grievance procedures; job classification; job analysis and evaluation; production incentive plans; suggestion systems; plant communication systems; and accident and fire prevention.

Tips on Spies or Saboteurs

SABOTAGE AND PLANT PROTECTION. Size 6 x 8 in.; 25 pp; paper bound. Published by the Chamber of Commerce of the United States, Washington, D.C. Price 50c per copy.

THIS IS A panel discussion from the Chambers 39th Annual Meeting with comments from civilian and military experts on the potential threat of spies and saboteurs. Discussed are such subjects as steps management can take to prevent sabotage; identification of saboteurs; how to handle disloyal employees; training of employees for plant protection; and protection of the interests of the government.

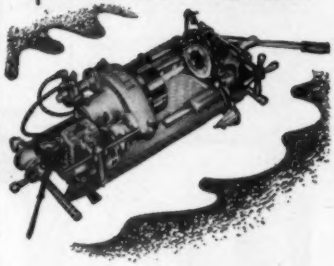
For Better Industrial Floors:

FLOOR FINISHES FOR INDUSTRIAL BUILDINGS. Size 6 x 10 in.; 28 pp; paper bound. Published as National Building Studies Special Report No. 11, by His Majesty's Stationery Office, available through the British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. Price 40 cents postpaid.

CHOICE OF FLOOR finishes for industrial buildings is a difficult problem and this report brings together recommendations of the Building Research Station regarding types and qualities of floor finishes suitable under various industrial conditions occurring in practice.

• LIGHTWEIGHT
• LOW-PRICED
• EASY-TO-MOVE

the New Beaver Model-E Pipe and Bolt Machine



The new low-priced, lightweight Beaver Model "E" is a "junior edition" of the heavy-duty Beaver Model A—which has, for the past 20 years, been the recognized leader in the field of portable pipe and bolt machines.

The Model "E" uses the same dieheads—the same dies—the same patented interchangeable wheel-and-roller or knife cutoff devices—the same reamer arm and cone—as the Models A and B. This will be a great advantage to thousands of shops now equipped with the Beaver Model A or B because it eliminates the necessity of carrying in stock duplicate dies and parts—thereby preventing endless confusion and needless expense. And remember, there are 195 different kinds and sizes of dies instantly available for Models A, B or E.

Although designed primarily for hardware stores and small piping contractors, BIG contractors will find the new Model "E" useful on jobs requiring extreme portability.

A pipe machine is no better than the service back of it and our 50 years of experience in this field, and our reputation for high quality and friendly service, is your best guarantee of complete satisfaction.

Price $385.00 with quick-opening die head and ½ to 2" dies. Stand (with 14" wheels) $20.00. Write for special bulletin on new Beaver Model "E" lightweight economy model.

BEAVER PIPE TOOLS

210-300 DANA AVENUE, WARREN, OHIO, U.S.A.

It covers the requirements for industrial conditions from the standpoint of durability, comfort, safety and appearance; the available types of floor finishes; and the selection of floor finishes for particular purposes, with particular reference to unusual conditions such as floors exposed to oils or fats, sugars and acids, salts, and exceptionally heavy traffic.

There is a section dealing with flooring repairs, reference to standards and codes, and two appendices, one dealing with the laying of heavy duty concrete floors and the second with hard surfacing of concrete floors.

Standard on Bearing Tolerances

TOLERANCES FOR BALL AND ROLLER BEARINGS, B3.5-1951. Size 8½ by 11 in.; 19 pp; paper bound. Published by American Standards Association, 70 E. 45th St., New York 17, N. Y. Price 75 cents.

THIS STANDARD establishes tolerances and limits of size governing dimensional interchangeability of various types of bearings. Compliance with these tolerances should be checked in accordance with the American Standard Gaging Practices for Ball and Roller Bearings, B3.4-1950.

The standard contains 15 tables specifying tolerances on the bore, outside, diameter, width, and other characteristics of a bearing in different grades of accuracy required for various bearing applications. Types of bearings covered are: annular ball; cylindrical roller (including journal); magneto; airframe; thrust ball; industrial and airframe needle; and tapered roller bearings.

Specifications are given for the maximum permissible variation in diameter between the largest and smallest ball or roller in any assembled bearing; for the hardness of balls, rings and rollers; and for snap ring and groove dimensions.

On Dimensional Analysis

DIMENSIONAL ANALYSIS AND THEORY OF MODELS by Henry L. Langhaar. Size 6 by 9 in.; 162 pp; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $4.00.

THIS BOOK explains the application of dimensional analysis to any particular phenomenon and what variables should be included in the equation.

Some of the items covered in the ten chapters will give an idea of the many phases in which dimensional analysis plays a part: use of models; model ship propeller; wind loads on large windows; bending of ductile beams; stresses in an arched dam; run-off from a watershed; condensation in a vertical pipe; and many others.

Several features of the book in-

No packing... no lubrication... no adjustment in service... no upkeep costs. You eliminate maintenance when you install *Corruflex* joints in your pipe lines. And, they're on the job all the time... absorbing expansion and contraction... protecting lines and equipment from strain. Full-time service without servicing!

Corruflex joints are more dependable, more efficient, longer lasting because they are made by the pioneers of the expansion joint industry. They are available in sizes from 3" to 24", single or double units, single or multiple corrugations, with or without self-equalizing rings, and with flanged or welding ends. Supplied in copper, stainless steel or other alloys and with internal sleeves if required.

Corruflex joints have traverses ranging from fractions of an inch to 15" and operate under pressures from vacuum to 300 psi and temperatures from subzero to 1600 F.

Send for 16-page Bulletin. Complete data on all *Corruflex* joints... simplified selection charts... summary of installation practice... *Bulletin No. T-35-51.*

AMERICAN DISTRICT STEAM COMPANY, INC. ★ North Tonawanda, N. Y.

MATERIAL HANDLING *News*

Read 'em and REAP

SAFETY SAVES!
Cartoons and a light touch sell the idea that safe operation and good care of materials-handling equipment pay off for company and operator. Pocket size. Available in quantity.

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For a clear understanding of modern handling principles and practices, have your entire staff read this one. Pocket size.

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A complete, compact showing and basic specifications of the Clark Leadership Line—fork-lift trucks, industrial towing tractors, powered hand trucks and special handling attachments.

MOVIE DIGEST
Clark movies enable you to see at your convenience modern machines in action. Synopses of films widely rated "the best in the materials-handling field," and how to borrow them.

These up-to-date publications will prove exceedingly valuable in cutting your handling costs and in getting the utmost benefit from your equipment. They are yours for the asking—any or all of them. Simply use the coupon.

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clude: an algebraic development of the theory of dimensional analysis that reduces the theory to a branch of algebra and connects it closely with the theory of linear algebraic equations; separate chapters devoted to applications of dimensional analysis in stress analysis, fluid mechanics, thermal problems, and electrical problems.

All About Buildings

ARCHITECTURAL GRAPHIC STANDARDS by C. G. Ramsey and H. R. Sleeper. Size 9 by 11½ in.; 614 pp including index; cloth bound. Published by John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $10.00.

Almost double the size of the previous edition, this fourth edition presents up-to-date information on all aspects of building construction, from usage and procedures to furnishings and fittings.

As in earlier editions, the information is presented by means of illustrations giving comprehensive details on the processes and materials required in architectural and allied fields. Proper dimensions, recommended usage and procedures, equipment, furnishings, fittings and appliances are covered.

Among the new subjects included in the fourth edition are special fireplaces, precast concrete joists, modern wall types, corrugated wire glass roofing and siding, steel stairs, modular casement windows, eaves and watertables for flat roofs, fiber board and wall board for interiors, acoustical data and materials, electric stairways, and many others.

Planned Production

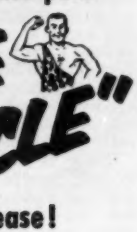
PRODUCTION FORECASTING, PLANNING, AND CONTROL by E. H. Mac Niece. Size 6 by 9 in.; 293 pp; illustrated; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $5.50.

THE THREE FACTORS of production—forecasting, planning, and control—are given an elementary, integrated treatment by Mac Niece. The book reduces the various methods and techniques of production to a set of principles, which are illustrated with specific examples of effective applications.

After covering the various phases of production, such as: job-order production, arrangement of equipment, inventory control, scheduling production, and cost accounting of materials, the last two chapters present a problem including all factors in forecasting, planning and control of a small but complete enterprise and the solution of this problem.

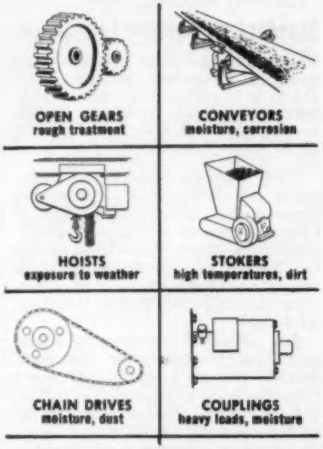
This volume should prove helpful for checking over your production methods to determine if any improvement or correction in your present arrangement should be made to obtain top performance.

Natural Graphite puts



into grease!

FOR EXAMPLE:



In Fact:—for *all* applications where conditions of dirt, dust or moisture prevail.

What are *your* tough lubricating jobs...where *ordinary* greases take a beating? Try greases fortified with Dixon *Natural* Graphite. Then see the big improvement!

Why? Because greases combined with Dixon *Natural* Graphite provide outstandingly effective lubrication *under even severest conditions* ...where dirt and dust abound; rain and moisture; high pressures; temperature extremes; shock loads.

Dixon *Natural* Graphite is practically indestructible. It withstands extremes of heat and cold. It is insoluble. Inert, it is unaffected by acids and alkalies. Processed under closest laboratory control.

What is your toughest lubricating problem? **Tell us the full particulars... our technical department will analyze your problem and send you specific recommendations and a sample of the proper Dixon lubricant. No obligation. Write, Joseph Dixon Crucible Co., Jersey City 3, N. J.**

DIXON
NATURAL GRAPHITE

DATA FILE

of literature for the plant library

STANDARD CATALOGS, bulletins and handbooks are listed to aid plant engineers in maintaining a permanent, up-to-date data file. For copies of these, write the number preceding the desired bulletin on the card in the heavy insert, pages 35-36 and 117-118.

MATERIALS HANDLING

201 For Efficient Overhead Handling — Bulletin C-1, 56 pp, pictures overhead equipment for practically all industries. Stresses construction, safety, electrical advantages of trolleys, cranes, track and auxiliaries. The American MonoRail Co.

202 Handling Equipment Ordering Book — Ninety-pp Catalog 23 describes power trucks, power jacks, stackers, cranes, hand trucks, platforms, storage racks. Fully illustrated. Lewis-Shepard Products, Inc.

203 Manual on Electric Hoists — Catalog H-46, 44 pp, covers monorail and stationary hoists and car pullers. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls; gives dimensions. American Engineering Co.

204 Handbook on Overhead Conveying Systems — Manual A-56 provides 200 pp of information on overhead track systems and conveying equipment. Pictures installations, construction details; gives engineering and application data. Richards-Wilcox Mfg. Co.

206 Portable Hoists — This bulletin describes a lightweight air hoist in 2000, 1000, 500 and 300-lb capacities. Gives specifications, dimensions, operating advantages. Keller Tool Co.

207 Fastenings for Conveyor Belts — This collection of data covers hinged fastenings, repair plates, lacings, hooks, round belt couplings, also lacers, cutters. Gives instructions for use. Armstrong-Bray & Co.

208 Safe Truck Operation — "Safety Saves!" is a cleverly written 24-pp booklet setting forth "do's" and "don't's" established as a practical code of truck operation. The admonitions, presented in easy-to-take good-humored fashion, and pointed up by cartoons are offered as both a "refresher course" and a fundamental text. Industrial Truck Div., Clark Equipment Co.

209 Data on Tramrail Equipment — Twelve-pp Form 2008F is a recently revised booklet on tramrail systems. Tells what an installation can do toward improving handling efficiency. Rail and arch design, switches, cranes and transfer bridges, carries, hoists, cranes, buckets, grabs are pictured. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

210 Conveying Systems Manual — Unloading and conveying of dry pulverized material are discussed in 24-pp Bulletin FK-25. Text covers system and operation; stationary pump, accessories. Fuller Co.

211 Electric Lifters—Medium and heavy-duty electric lifters are described and illustrated in Bulletin LU50. Company's ball bearing hoisting unit is discussed, mechanical data included. Economy Engineering Co.

212 Conveyor and Elevator Belts—This 26-pp collection of catalog sections illustrates parts used in construction of com-

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SAF-T-LAG
THERMAL FUSES

● Maximum fuse protection is determined largely by *good timing*. Therefore SAF-T-LAG Fuses are precision timed to accurately meet the working load requirements of specific types of equipment.

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STEEL WORK BENCH!

Everyone dreams of hooking the *biggest* fish . . . everybody wants a *HALLOWELL* Bench. They're both *prizes* in any man's language!

The man who buys a HALLOWELL likes its *standard-unit design* which simplifies plant layout, its *tough, steel construction* which reduces maintenance and replacement for years to come, and its *trim, good looks* that improve shop appearance.

The man who works at a HALLOWELL likes its *smooth, splinter- and oil-proof, durable* work surface, its *rock-solid sturdiness* and its *convenience*.

Whether you buy or use work benches, you'll want to look over Bulletin 701.

Write for your copy today.

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STANDARD PRESSED STEEL CO.

JENKINTOWN 26, PENNSYLVANIA

pany's conveyor and elevator belts. Discusses increased service life and decreased maintenance. The B. F. Goodrich Co.

214 Industrial Logistics—Form A-9516-4450 is a 12-pp booklet covering strategic handling of materials from raw state to distribution. Discusses master unit load and transportation cycle. Explains company's system of adapting all loads to four types of containers, assembling maximum numbers of these into master unit loads, and transporting them as single units. Tells how to apply system and cites some examples of its use. The Elwell-Parker Electric Co.

215 All-Around Bulk Handler — Catalog Supplement 8065, 16 pp, describes the Dumpster, a truck-mounted carrying and dumping unit which does the work of several trucks by means of interchangeable containers. Shows how different containers handle a wide range of bulk materials, solids, liquids. Dempster Bros.

216 Materials Handling Equipment — Comprehensive Catalog P602 is a 44-pp guidebook on materials handling equipment for industrial plants. Subjects covered include description and application data on company's gas and electric fork lift trucks, motorized hand trucks, hand lift trucks and hand and electric hoists. Describes attachments available for the industrial trucks to give them versatility. Contains more than 100 photos of equipment in use. Yale & Towne Mfg. Co.

217 Metal Conveyor Belts — This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belt; covers raised edge and flight constructions, chain edge constructions, high temperature belts, wire conveyor aprons. Includes photos, data on weaving limits, weight, mesh openings, take up for wire conveyor belts. Wickwire Spencer Steel Div., The Colorado Fuel and Iron Corp.

ELECTRICAL

223 Motor Control—A handy reference book on modern motor controls, comprises 76 pp of condensed information, dimensions and prices of the most popular items in company's line. Covers a-c manual and magnetic across-the-line switches; a-c voltage starters, control relays and contactors; synchronous and high voltage starters; d-c control relays, contactors, starters; drum switches, a-c d-c rheostats, speed regulators; push buttons, limit switches, and accessories. Allen-Bradley Co.

224 Motor Handbook — Bulletin MU-185 provides 66 pp of engineering and descriptive data on motors, covering splash-proof and explosion-proof types, gear motors, motors for use in chemical plants, for oil well pumping, punch presses, elevators, cranes and hoists. Wagner Electric Corp.

225 Power Distribution Feeders — Catalog TEB-1, 40 pp, on heavy-duty units for main feeders in distribution system, gives construction, engineering, application data. The Trumbull Electric Mfg. Co.

226 Precision Switches—Twenty-pp Catalog 81 covers industrial switches for a-c circuits. Describes general purpose basic switches, auxiliary actuators, enclosed, explosion-proof and splash-proof types, limit switches, small switches. Includes technical data, prices. Micro Switch.

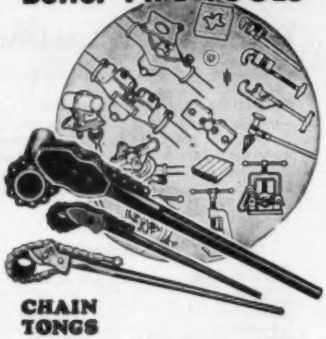
227 Electric Motor Lubrication Studies—Bulletin 1579 shows comparative amounts of lubricant in different designs of bearings, how bearings are subject to air circulation. Explains company's Lubriflush principle. U. S. Electrical Motors, Inc.

228 Small Bus Duct—Detailed information on a midget-size bus duct is contained in Bulletin 703. Illustrates entire unit, also strap and hanger. Text discusses major parts, design features. Includes list prices. Frank Adam Electric Co.

229 Bus Duct Manual—Booklet B-4272A, 68 pp, on bus duct and accessories, presents application and test data, specifica-

ARMSTRONG BROS.

Better PIPE TOOLS



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"Reversible," "Standard" and "Ideal" types in all sizes. Jaws are drop forged from special steel, are carefully milled, heat treated hardened and tested. The Handles are forged spring steel. The Chains are proof-tested to ⅔ catalog strength (1,200 lb. to 40,000 lb.). "Reversible" Jaws give double jaw life. "Standard" Jaws have extra bearing on the handle and forged-in chain guides. The "Ideal" Tongs have V shaped teeth for a sure grip on irregular shapes—fittings, etc.

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QUICKLY

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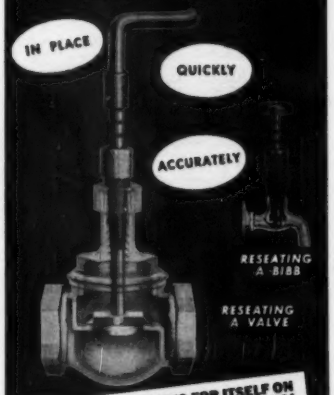

PAYS FOR ITSELF ON FIRST 2 OR 3 JOBS!

Don't junk expensive globe or angle valves, bibbs, fixtures—reseat them! Order Skinner Valve and Bibb Reseater. Easy to use. Guaranteed cutters leave seat glass-smooth, level, tight.

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2 1/4" to 3" $45.00

M. B. SKINNER CO.

SOUTH BEND 21, INDIANA, U. S. A.

tions, information on pricing a typical installation. Describes advantages of bus duct for a secondary power distribution system, carrying current from transformers to switchgear—and from there to motors, lighting systems, etc. Tells where bus duct can be used to advantage. Company's line of bus duct is shown and dimensions given. Also presented are overload protective units. A technical section gives tables and formulas useful in applying bus duct correctly. Westinghouse Electric Corp.

230 Distribution Duct Engineering Data—Bulletin 427-4 contains 32 pp of data for estimating ventilated duct for feeder circuits, plug-in duct, and plug-in duct for branch circuits. Includes instructions for laying out distribution duct jobs, and pointers on estimating, diagrams, layout symbols. BullDog Electric Products Co.

231 Plug-In Power — Sixty-pp Catalog 25 offers real help on electrical installation problems involving portable tools, materials handling equipment, cranes, hoists, cutting equipment. Covers a prefabricated trolley busway electrical distribution system to provide outlets for power or light where needed. Includes specifications, mounting data. Feedrail Corp.

232 More Power from Your Batteries—Eight-pp Form GB-1309 presents company's plan for conserving and extending battery power. The plan is a complete and integrated system of manuals, articles, specifications, bulletins, charts and record cards which explain how to select, charge and handle, maintain and determine condition of batteries without waste. Industrial Div., Gould-National Batteries, Inc.

233 Buyers' Manual on Motors and Control—Fifty-pp Catalog GEC-1009 presents buying information on a carefully selected group of motors, motor starters, control accessories and electronic control. Ratings listed are those most frequently required. Excellent selection data, dimensions, ratings and prices. General Electric Co.

235 Weatherized Motors—Six-pp Bulletin 400 describes company's All-Weather integral motors for industrial use. These have full height protection, through ventilation, one-piece steel shell, interchangeability of end head. Robbins & Myers, Inc.

"He's too good a worker to fire . . . let's just take him off the time clock!"

236 Power and Control Cables—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Gives standard reel sizes and capacities, standard specifications. Rome Cable Corp.

237 Retractile Cords—Bulletin KKG describes and pictures some of the applications for permanently coiled, neoprene jacketed electric cords which expand to 3 times retracted length. Kolled Kords, Inc.

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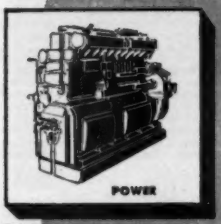

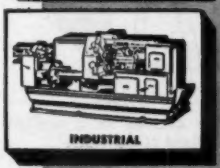

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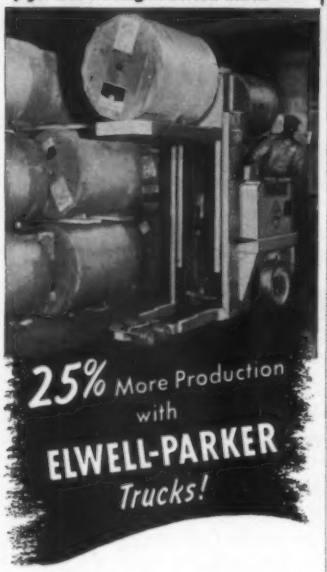

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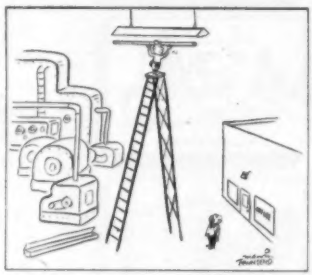
LIGHTING, COMMUNICATION

238 Industrial Lighting at Work—Sixteen pp Booklet B-4727 stresses three ways of putting better lightning to work: cutting costs by promoting more production; increasing efficiency by ensuring accuracy, and reducing accidents by exposing dangerous operations. Analyzes mercury vapor and incandescent light sources as to efficiency, service life, maintenance, mounting height and job suitability. Luminaires of each type are pictured; wattage and lumen output ratings. Westinghouse Electric Co.

239 Recommended Lighting Systems — This 16-pp article describes six lighting systems adaptable to most industrial plants. They include systems for illumination levels of 20 to 40 ft-c, for levels of 40 to 60 ft-c and for levels of 60 to 100 ft-c, and involve use of filament, fluorescent, and mercury lighting and combinations of these. Explains lighting classifications, telling which jobs require higher ft-c levels, and discusses advantages of each type of lighting. Also discusses supplementary lighting. Lamp Dept., General Electric Co.

240 Plant Lighting Planning Guide—This 32-pp handbook of industrial lighting presents economics of a plant lighting program in terms of lower production costs, reduced working time, less fatigue and eyestrain, less spoilage, fewer accidents, better morale. Explains six major steps in initiating, developing and carrying out a lighting program; tells how to select equipment and stresses importance of maintenance. Includes table of recommended levels of illumination for industrial interiors. Benjamin Electric Co.



"Wait! I've decided on a daylight tube, instead of the white."

241 Plant Communication Systems—This 25-pp brochure describes a high and low level intercom system readily installed and permitting two-way conversations over close-speaking microphones and receivers as well as paging over loudspeakers suited to different noise levels. Tells how system can benefit your plant. Gai-Tronics Corp.

VENTILATING, AIR CONDITIONING, DUST CONTROL

242 Dust Collectors — Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk and Blum Mfg. Co.

243 Dust Control—Bulletin 98 explains value of industrial dust control and principles of dust suppression, collection by filtration. Describes dust control equipment, providing specifications, dimensions on filters, systems, automatic controls. The W. W. Sly Mfg. Co.

244 Industrial Dry Coolers — Illustrated Bulletin DC-50, 12 pp, presents company's line of dry cooling equipment for small, "in-between," and heavy-duty cooling jobs and includes three recently introduced models. Two of these are small "portable" units and the third a medium-size unit. Although designed primarily for cooling

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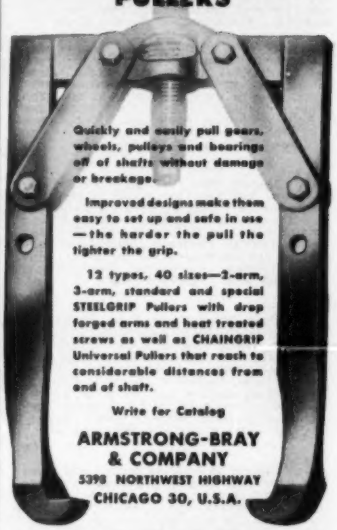

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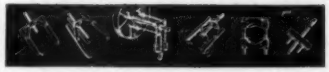

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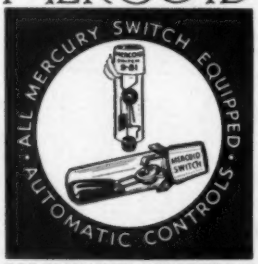

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engine jacket water, they can also be used for cooling natural gas, lube oils, fluids of refining stages. The Marley Co., Inc.

245 Vacuum of Many Jobs — Bulletin 144, 20 pp, describes and illustrates 132 unusual industrial uses for company's vacuum system. The Spencer Turbine Co.

246 Dust Precipitators—Twelve-pp Bulletin 1728 covers manufacturer's latest design of dust precipitators, a line designed to handle fly ash, cinders and industrial dusts, to meet the need for a compact, simple, economical all-purpose mechanical type unit. Includes performance and efficiency curves. American Blower Corp.

249 Dust Recovery — "Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoints of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size distribution and specific gravity of dust on efficiency. Buell Engineering Co., Inc.

250 Dust Control Technology — Detailed selection, operation, and maintenance data are contained in this 50-pp digest-size book, "Industrial Dust Control Through Exhaust Systems." Treats exhaust hoods, piping systems, dust collecting equipment, exhausters and drives. Lists basic methods of dust control and analyzes elements of exhaust systems. Discusses control of air movements, recommended hood and enclosure design, exhaust air velocity and volume and rules for installing system piping. Pangborn Corp.

PIPING, VALVES, TRAPS AND FITTINGS

251 Design Properties of Pipe—This 12-pp booklet consists of tables listing pipe sizes and wall thicknesses currently established as standard, plus what is believed to be the most nearly complete tabulation ever published of dimensional properties of commercially available sizes of steel pipe. Tube Turns, Inc.

252 Piping Pointers—This is a new 36-pp edition of company's popular piping manual covering fundamentals of sound piping practices. Discusses various types of valve designs and how each should be used. Pictures and names more than 80 kinds of fittings and contains many illustrated how-to-do-it features. Included with the manual is an 8-pp valve selection guide. Crane Co.

253 Valve Maintenance Guide — "Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented. Discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

254 Steam Hook-ups—This 64-pp manual on hook-ups for steam traps, air vents and temperature controls provides diagrams, size calculations, selection data on traps and regulators, properties of saturated steam, dimensions. Sarco Co., Inc.

255 How to Choose and Use Air Traps—Bulletin 202 describes air trap selection and installation for automatic drainage of moisture from compressed air intercoolers, aftercoolers, receivers, separators and drip points. Armstrong Machine Works.

256 Steam, Air, and Gasoline Traps — Illustrated Catalog 250 describes several types of thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, piston-operated steam traps, also steam, air and gas separators. Includes capacity tables, installation diagrams. W. H. Nicholson & Co.

257 Strainers and Separators — Bulletin R-46-50A is a 16-pp catalog on T-type strainers, suction strainers, multi-flow and receiver separators. Contains dimensions, prices. American District Steam Co.

259 Unions and Fittings — Twelve-pp Catalog 50 covers manufacturer's line of

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unions of all types, elbows, tees and fittings. Describes special construction features. E. M. Dart Mfg. Co.

262 Safety Head Catalog — Section 10, Part 1 of Catalog 54, 52 pp, contains charts and tables covering almost any phase of safety head information. Tells where safety heads can be used and how to use them. Gives advantages of manufacturer's line in protecting pressure equipment. Tells how to choose safety head assemblies and rupture discs. Includes tips on lowering temperature at point of safety head location. Black, Sivalls & Bryson, Inc.

263 Solving Steam Trap Problems—This popular 36-pp catalog on steam traps contains specifications and capacities on steam traps, float traps, air release valves and pipe line strainers. Tells how to calculate condensation loads and select traps for all classes of equipment, including unit heaters, jacketed kettles, autoclaves, submerged surfaces, steam mains and header drips. Gives pointers on how to install traps and service them. The V. D. Anderson Co.

264 Steam Trap Reference Manual—A lot of application and selection information on steam traps is packed into 24-pp Bulletin T-1740. Tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure traps sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Also provided are installation and operating tips, construction details, prices. Yarnall-Waring Co.

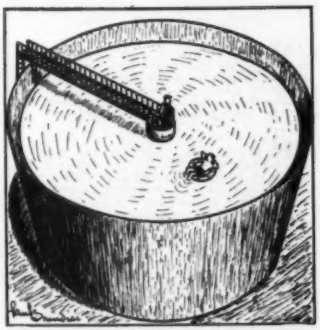
265 To Stop Those Leaks—Catalog 41-0 offers 28 pp of helpful ordering and application data on pipe repair clamps and saddles, valve and bibb reseaters. Illustrates each product, tells where to use it and how to install it, giving dimensions and prices. M. B. Skinner Co.

FUELS, LUBRICATION

266 Viscosity of Fluids—The larger significance of viscosity is discussed in Nos. 5 and 6, Vol. 36 of Lubrication, a technical publication. Illustrates simplest conception of streamline flow between two surfaces having relative motion. Shows how viscosity is measured. The Texas Co.

267 Lubricant Data Book—This pocket-size 56-pp booklet gives product information and principal uses of approximately 40 lubricants of both grease and fluid types, and general directions for proper application. Discusses lubricant requirements of equipment in 25 major industries. Lubriplate Div., Fiske Brothers Refining Co.

268 The Why, What and How of Lubricants — This 20-pp booklet explains and illustrates common tests and terms describing lubricants. Covers viscosity, flash and fire, neutralization, number, penetration, specific gravity, extreme pressure, steam emulsion, corrosion. Tide Water Associated Oil Co.



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269 Lubrication of Refrigeration, Air Conditioning Equipment—Revised Technical Bulletin B-3 is a 56-pp clearly illustrated manual filled with practical tips on good lubrication practice for both large systems and small units. Discusses types of refrigerating systems, functions of essential parts, characteristics of refrigerants, effect of refrigeration on oils, lubrication recommendations and the applications of refrigeration. Text also covers selection of oil and detailed instruction on lubrication of compressors, bearings, air conditioning equipment. Oils for low temperature installations are described. Sun Oil Co.

271 Cooperative Technical Consultation Service—This informative 24-pp booklet presents company's periodic consultation service offered to industrial plants and aimed at the most efficient use of petroleum products. Covers services available in the solution of lubrication problems, metalworking operations, processing, fuel and heating oils, dust control. Gulf Oil Corp., Gulf Refining Co.

MECHANICAL POWER TRANSMISSION

272 Chain Drive Manual—Catalog SCE-50, 68 pp, on chain drives, cites advantages and recommends applications. Gives information on chain length calculations, installation and maintenance, ratings, chain types, pitch and sprockets. Includes prices. Whitney Chain Co.

275 Manual on Power Transmission Machinery—Containing 225 pp of data, this illustrated handbook covers roller bearings, V-belt drives, friction clutches, couplings, collars, sleeve bearings, pulleys, take-ups and hangers. Provides engineering, selection, ordering information; includes formulas. Dodge Mfg. Corp.

276 Power Drive Handbook — Catalog 709, describing roller chains and sprockets, includes tips on selecting stock roller chains for every type of power drive service. Diamond Chain Co., Inc.

277 Handbook on Chains and Sprockets — An excellent reference book is 216-pp Catalog A418. Discusses various chains and their service applications, metals used in them, and factors affecting their efficiency. Gives selection information on chains for drives and for elevators and conveyors. Engineering data includes dimensions, strengths, weights. The Jeffrey Mfg. Co.

280 Manual on V-Belt Drives — Catalog 280 is pocket-sized, but contains 384 pp of illustrations, tables and other technical information to make it possible to select V-belts for any power transmission drive quickly and accurately. List prices, dimensions included, also a 12-pp supplement on cog belt drives. The Dayton Rubber Co.

281 Blocks and Sheaves—Catalog 300-24, 24 pp, covers manufacturer's complete line of blocks and sheaves. Provides block number, capacity in tons, number of sheaves, rope size and weight of each block. Illustrations, ratio table and formula included in a section on figuring line parts. American Hoist & Derrick Co.

PUMPS, COMPRESSORS

282 Centrifugal Pump Care — Sixteen-pp Bulletin 06X6256A is a handbook on the care of all makes of centrifugal pumps. Tells how to figure head, determine friction loss. Discusses causes of troubles and their cures, includes maintenance time table. Tells how to prevent cavitation, common mistakes in packing stuffing boxes. Allis-Chalmers Mfg. Co.

283 Centrifugal Pumps — Single- and two-stage pumps for small boiler feed service, cooling tower service, bottle washing, brine circulation, general water service, hot well service are described in Bulletin W-306-B1. Includes ratings Worthington Pump and Machinery Corp.

284 How to Solve Pumping Problems—Form 3060 is a 130-pp manual on selection, use of pumps. Tells type of pump construction best suited for handling 150 liquids. Explains how to determine size,

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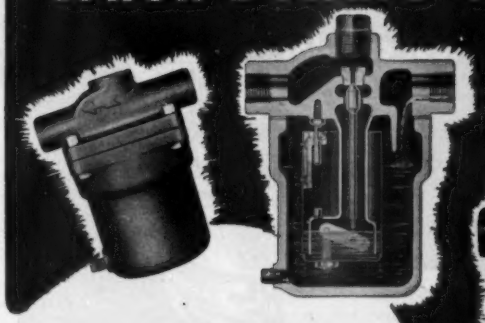

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compute suction list and discharge head, determine direction of rotation and size of speed of pulleys or gears. Gives instructions for installing rotary pumps, locating trouble. Geo. D. Roper Corp.

286 Air Compressors—Twenty-pp Form 834, a catalog on air compressors, includes selector charts and case examples to facilitate choice of right model. Describes and illustrates single and two-stage, vertical and horizontal types, including compressors for low pressure service. The Wayne Pump Co.

289 Multi-Stage Compressors — Featured in 36-pp Bulletin 116 is a presentation of engineering data and performance characteristics to enable plant engineers to approximate power requirements, rotative speed and discharge temperature for most multi-stage centrifugal compressor applications. Clark Bros., Co., Inc.

MAINTENANCE

290 Drip Preventive Handbook — Insulation of pipelines, tanks, cold air conditioning ducts and wall surfaces against corrosion and condensation drip is covered in pocket-size 32-pp Form F-17. Describes coatings, tells how to apply. Includes coverage tables. J. W. Mortell Co.

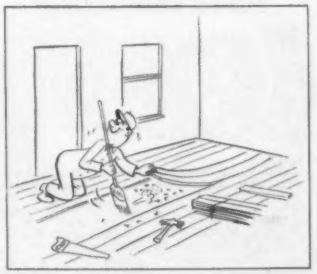
291 Painting with Aluminum — Form AD-228, 28 pp, tells how and where to use aluminum paints. Covers painting of metal, concrete and masonry and other non-absorbent surfaces; of weather-exposed wood, and of interior heated surfaces. Aluminum Co. of America.

292 Iron Cement Handbook — This is a 40-pp pocket-size catalog of iron cements for repair, other uses. Tells how to mix and apply them. Gives illustrated instructions for dozens of repair and maintenance jobs. Smooth-On Mfg. Co.

293 Building Maintenance — Handbook 7, offers 64 pp of information on floor surfacings, leak stoppers, external wall sealants, road patching, roofing materials. Includes instructions for use. Flexrock Co.

294 One-Coat Insulation — This 32-pp booklet describes company's Type D insulation, a sprayed-on coating for surfaces with temperature range from —40 to 300 F. Tells how one application of this coating not only insulates but also waterproofs, rustproofs, deadens sound, prevents condensation and resists fire. Tells how to apply the insulation, discusses K factor, bonding properties; describes some specific uses—tank surfaces, heat ducts, metal surfaces of large buildings. Includes many photos of showing its use on buildings, equipment. Insul-Mastic Corp. of America.

295 New Floor in Minutes—This folder describes an instant-use, ready-mixed plastic floor patching or resurfacing material which can be applied after wire-brushing the broken concrete or worn portion and is ready for use within 5 min. Gives directions for applying. Dura-Tred Co.



297 Floor Maintenance—This is an authoritative 12-pp brochure presenting a complete and economical program for the care of wood and concrete floors, terrazzo,

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linoleum and tile. Points discussed include wear resistance, appearance, sanitation, cleanliness, light reflectance, sealers and hardeners, burnishing and buffing, waxing, and painting of concrete floors. The Tremco Mfg. Co.

298 Corrosion-Preventive Coatings—This 16-pp illustrated booklet covers a family of products for fighting corrosion. Presents characteristics and application data on hot and cold applied tar base coatings, alkyd resin coatings, chlorinated rubber base coatings, vinyl and phenolic coatings. Includes finder chart. Protective Coatings Div., Pittsburgh Coke & Chemical Co.

CONSTRUCTION

300 Roofing Manual—Engineering data on roofing is given in Specifications 50, 30 pp. Covers coal tar pitch roofings, waterproofings, insulations, flashings, protective coatings. Includes illustrated instructions. Tar Products Div., Koppers Co., Inc.

301 Building Panel Engineering Data—This 46-pp reference book on use of steel and aluminum panels for walls, decks and roofs, discusses their use, advantages, methods of installation. Covers acoustically treated panels, fire resistance ratings, electrification, acoustic roofs, reinforcing floor forms. Fenestra Building Products Co.

302 Glass Block and Where to Use It—This 32-pp book gives design data, information on functional and decorative aspects of glass block. Covers properties, specifications, erection procedures. Insulux Div., American Structural Products Co.

303 Technical Data on Plexiglas—This is a file folder of information on Plexiglas sheets, rods, molding powders, covering workability, properties, thicknesses. Discusses large area lighting. Rohm & Haas Co.

304 Building Construction and Maintenance Manual—Here's a 112-pp illustrated manual packed with facts on concrete and wood floor treatments, paints, protective coatings, concrete and mortar admixtures, waterproofing and dampproofing, caulking compounds, and roof coatings. Indexed, estimating guides on floor treatments and roof coatings, brick requirements, timber requirements and water-cement ratios. L. Sonneborn Sons, Inc.

305 Technical Manual on Plywood—Available basic data on Douglas fir plywood, its properties and use, are offered in looseleaf sections with firm binder. Presents engineering information about this panel material and its performance in varying applications. Covers commercial standards, designing with plywood, prevention of condensation, lateral bearing strength of nailed plywood joints, deflection. Please give your title when requesting this book. Douglas Fir Plywood Assn.

INSTRUMENTS, CONTROLS

307 Data on Spring Scales—This informative catalog offers 40 pp of application and ordering data on spring scales and test apparatus. Covers dynamometer scales, push-pull gages, straight-spring scales, platform scales and conveyor scales, also compression and tension testers, tensiometer, torque tester and consistometer. Illustrated with photos, dimensional sketches, explains operation of the various instruments. John Chatillon & Sons.

308 Industrial Control Devices—Catalog 8303, 64 pp, presents 100 models of non-indicating electric, electronic, and pneumatic controllers for flow, pressure liquid level and humidity applications. New instruments shown, include electronic temperature controllers. Brown Instrument Div., Minneapolis-Honeywell Regulator Co.

311 Handbook on Automatic Controls—Catalog 700 provides 45 pp of ordering and application data on automatic controls with mercury contact switches. Covers control equipment for temperature, pressure, low water, liquid level, boilers; transformer-relays, control valves, mercury switches. The Mercoid Corp.

313 Electrical Instruments—A line of instruments for production testing, plant maintenance and service is shown in 16-pp Bulletin A-16-B. Among these are a-c clamp volt ammeters and a-c clamp ammeters, circuit testers, analyzers, mutual conductance tubechecker, pocket-size meters, matched a-c and d-c portable instruments, also current transformers, light meters. Weston Electrical Instrument Corp.

PACKINGS, SEALS

315 Data on Packings—Form 438 is a collection of bulletins on flexible metallic packing, semi-metallic packing, rotary mechanical seal, oil pressure system and steel packing tools. Durametallic Corp.

317 Mechanical Seals for Rotary Shafts—Illustrated with cutaway drawings, this 12-pp booklet covers seals of the positive, chevron, and o-ring types, giving specifications. The Garlock Packing Co.

318 Buyer's Guide on Packings—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings previously available only in product bulletin sheets, and includes data on packing for liquid pistons on inside-packed piston pumps. Self-lubricating, molded and special packings covered. Greene, Tweed & Co.

WATER CONDITIONING

319 Hydrogen Zeolite Softeners—Publication 4530, 16 pp, presents hydrogen zeolite (cation exchange) water softening equipment. Gives a complete description of the process and the field of application, showing advantage of hydrogen zeolite softening and its relation to older sodium zeolite softening process. Cochrane Corp.

320 Scale Formation—This is a technical article on mechanics of scale formation, corrosion, other attacks on boiler metals, and how de-scaling unit works to correct, eliminate them. Butler Engineering Co.

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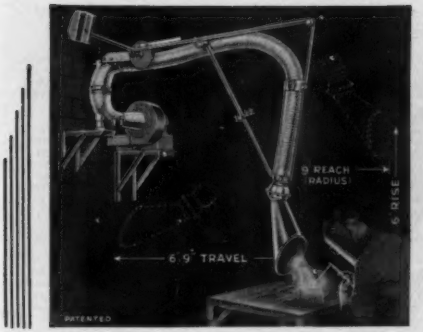

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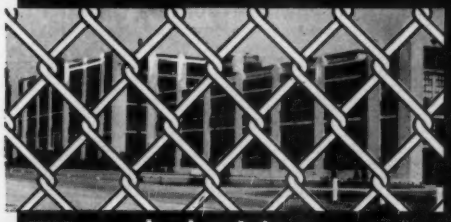

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HEATING

321 Heating Controls — Form F-1743-2 is a 36-pp catalog on controls for heating and air conditioning. Covers thermostats, motor operated and solenoid valves, control motors, linkage and dampers, control systems and packaged units, program switches. Barber-Colman Co.

322 Plumbing and Heating Supplies—Edition F is a 118-pp catalog listing over 2500 repair parts and precision tools for maintenance of all types of plumbing fixtures. Fully illustrated, includes plumbing fixtures. J. A. Sexauer Mfg. Co., Inc.

323 Unit Heater Selection — Sixty-pp Bulletin DS-327B tells how to choose propeller-type unit heaters, where to locate them and how to install them. Shows how manufacturer's heaters are constructed. Covers heaters for ventilation with duct work, piping details, controls, maintenance tips, steam and hot water capacities. The Trane Co.

324 Heat-Transfer Equipment — An excellent source of information on shell and tube heat transfer equipment, 28-pp Catalog DM-1150 covers heat exchangers, tank suction heaters, oil preheaters, condensers, evaporators, after-coolers, gas coolers, centrifugal pumps and water heaters. Instructions for installation, operation and maintenance are included. Bell & Gossett Co.

325 How to Save Waste Heat—The utilization of unit heaters for recovery and distribution of waste heat from engine and compressor jacket water is covered in 4-pp Form 00531A. Method of using waste heat to lower space heating costs is explained. Several installations are detailed to illustrate piping hookups, control methods. Also shows how to select correct size and type of heater. Modine Mfg. Co.

ENGINES, GENERATORS

326 Re-Circulation Steam Generator — Here's a 6-pp folder introducing a controlled re-circulation steam generator, describing its development, recommended uses. Combustion Engineering-Superheater, Inc.

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327 Modern Steam Engines — Stressing value of "by-product" power, Bulletin 308 describes vertical steam engines of both throttling and automatic governor types. Troy Engine & Machine Co.

TOOLS

328 Pipe Tool Operating Guide — Form O.G. is a concise 4-pp folder prepared to help users get best results from portable pipe and bolt machines and hand pipe tools. Tells quickly how to locate and correct pipe machine and hand pipe tools troubles. In all, 31 operations are covered. Beaver Pipe Tools, Inc.

329 Tool Catalog — Hand and power tools, tool sets, kits and related equipment are presented in 110-pp Catalog T. Includes descriptive, ordering and application data. Snap-On Tools Corp.

330 Pipe Tool Ordering Guide—Newly-published Catalog, 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs, and wrenches, giving dimensions, selection information. Includes price list. Armstrong Bros. Tool Co.

331 Powerful Puller—Introduced in Bulletin 97-A is the compact Power-Twin, a fast-working hydraulic ram designed to take the hard work out of pulling jobs. Shows how this ram, with its center hole feature, can convert all of company's pulling systems to hydraulic push, pull or lift operation. Owatonna Tool Co.

OTHER EQUIPMENT

332 Wire Cloth and Screen—This 48-pp handbook offers valuable help in selecting and ordering industrial wire cloth and woven wire screens. It's illustrated with photos showing wire sizes, spacing, weaves and crimps and types of openings. It discusses applications of different types, and metals used. Includes weights of copper, brass and iron wire per 1,000 ft. Korb-Pettit Wire Fabrics and Iron Works, Inc.

333 Steel Cabinet Benches—Construction features of steel benches are covered in 8-pp Bulletin 702. Six models are illustrated with dimensions and available top materials given. Standard Pressed Steel Co.

334 Elevated Steel Tanks—Welded steel tanks with ellipsoidal bottoms and roofs are presented in this 24-pp booklet as an economical means of increasing plant water storage capacity, maintaining uniform pressure, meeting peak loads and reducing pump costs. Full color illustra-

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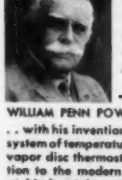

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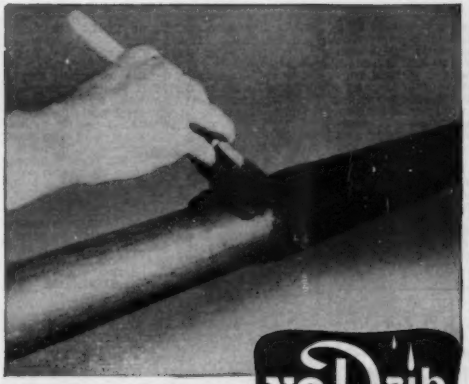

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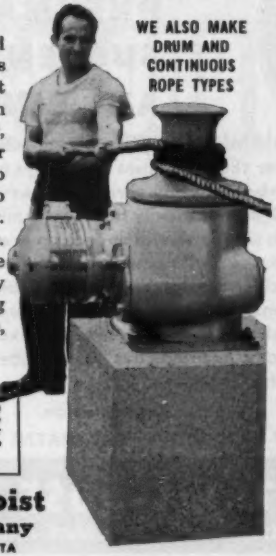

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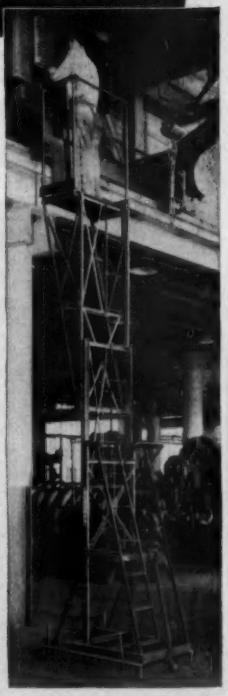

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tions show seven models. Capacity table included. Chicago Bridge & Iron Co.

335 For Tramp Iron Removal—Sixteen-pp Catalog 15 is a new and excellent source of material on non-electric permanent magnetic separators for tramp iron removal. Complete descriptions of separators, engineering data including photos, drawings and tabular specifications given. Selection data provided. Eries Mfg. Co.

336 For Cleaner Coal Burning — This 8-pp illustrated bulletin describes company's Turbo-Aire over-fire systems designed for cleaner coal burning. Explains how they work to eliminate smoke and promote efficient combustion. Includes selection chart, specifications, fan data and characteristics. Canton Stoker Corp.

337 Insulating Fire Brick—This bulletin presents economic advantages, industrial applications and refractory properties of an insulating fire brick for sustained use at 3000 F. Physical and thermal characteristics are given. Johns-Manville.

338 Case Histories on Brushing Problems—The solutions to 12 industrial brushing problems are told in this 32-pp illustrated booklet. Shows how rotary wire brushes, specially selected or engineered for the job, are used to clean welds in meat handling equipment, to finish stainless steel sheets, and perform other abrading, cleaning and finishing jobs. Brush Div., Pittsburgh Plate Glass Co.

339 Engineering Data on Coal Crushers—Catalog 784-A is a 40-pp guide to the selection of coal crushers. Covers single-roll crushers, stoker coal sizers, Flextooth, Flexroll, and rotary ring crushers, double-roll crushers, swing hammer pulverizers, reversible hammer crushers, and disintegrators. Gives full dimensions and capacity data. The Jeffrey Mfg. Co.

340 Solder Text — This 36-pp book is basically an editorial treatise, well illustrated. Separate sections are devoted to thermal effects, mechanical properties, principles of soldering and fluxes. Selection of proper solder for the job is explained, and fusible alloys described. Practical suggestions and description of company's solders are provided, also technical data, including melting range of tin-lead solders, ASTM, SAE and other specifications. Federated Metals Div., American Smelting and Refining Co.

341 Steam Boilers—Form SG 128-749 is a four-color catalog illustrated with photos of steam boilers for processing and heating, ranging from 15 to 500 hp and 15 to 200 psi. Includes a diagrammatic cross-section showing the four pass design characteristic of manufacturer's boilers. Cleaver-Brooks Co.

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342 Replaceable Air Filter—Introducing the Amer-glas filter, which comes in standard sizes for forced heating, ventilating and air conditioning systems, Bulletin 211 explains the operating principle of this filter and discusses its resiliency, efficiency and maintenance. Also gives sizes and installation data on frame units. American Air Filter Co., Inc.

343 Four Handy Guides for Plant Engineers—Bulletin 20B6051J, 12 pp, offers data on figuring V-belt drives; Bulletin 51B-6025E, 12 pp, for quick selection of electric motors; Bulletin 52B6059E, 16 pp, for selection of centrifugal pumps, and Bulletin 25B6051B, for power generation, distribution and control equipment. Specify booklets wanted. Allis-Chalmers Mfg. Co.

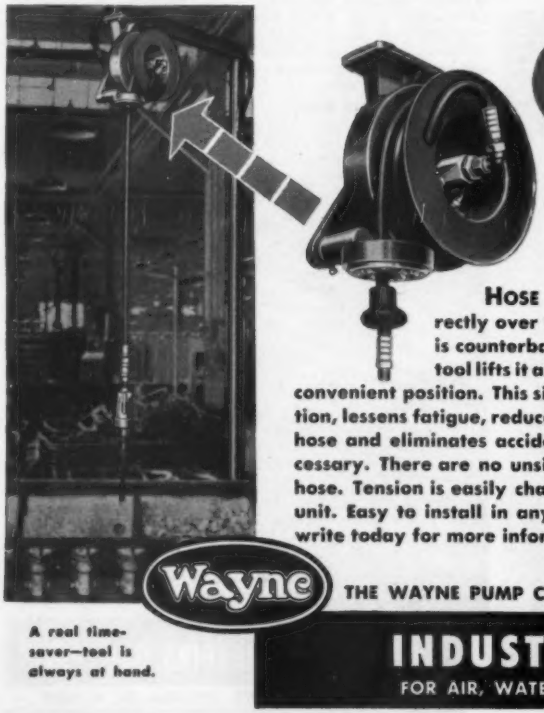
344 Vacuum Blasting — The efficiency and economy of vacuum blasting equipment for cleaning of equipment and other maintenance jobs, weld preparation, and conveying of granular material, is presented in this bulletin. A flow chart illustrates operation. Vacu-Blast Co., Inc.

345 Group Washing Equipment—Washfountains designed for modern group washing requirements for industrial plants and institutions are described and pictured in Bulletin D-766. Bradley Washfountain Co.

346 Dry Chemical Extinguishers — New quick-acting fire extinguishers of the dry chemical type in 20 and 30 lb sizes are covered in Form C-104. Shows how this self-contained unit is designed, operated. C-O-TWO Fire Equipment Co.

347 For Conductometric Determination of Solids—A quick and simple method for determining solids content of boiler water or condensate is explained and illustrated in Bulletin 2RE50. Hall Laboratories, Inc.

348 Neoprene Goes to Work — Eight-pp Bulletin A-18 discusses the properties of manufacturer's Neoprene, showing how they are utilized in products made from this chemical rubber. Text covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame resistance, chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.



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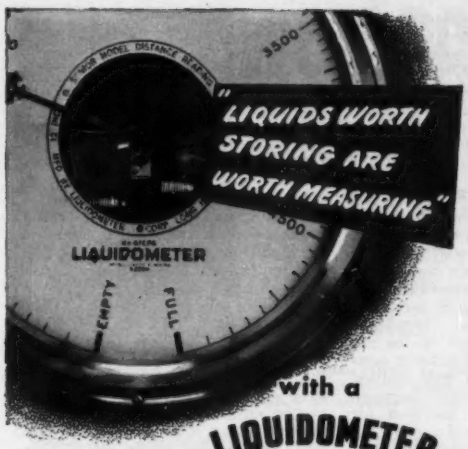

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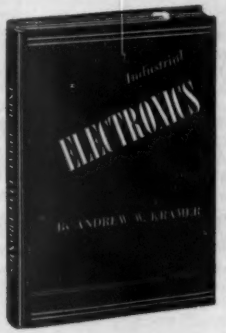

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Unit Heaters —

(Continued from page 94)

cheaper to install than two or three units, when operating costs are considered, the multiple installation may be more economical due to the smaller horsepower of the motors.

The selection of hot water or steam systems is entirely dependent upon which system is more practical and economical for the particular application. Hot water systems have a few advantages over steam systems. Installation costs are usually lower since pipe sizes, at high water temperatures are often smaller than in low pressure steam systems of the same capacity. Traps, strainers, and vacuum pumps are not needed, although a circulating pump is required.

Hot water systems also make possible simpler, more accurate control. The final air temperature should always be checked when unit heaters are selected for hot water applications. The temperature must be high enough to provide the comfortable conditions required; too low a temperature will cause drafts. The most commonly used steam systems are the vacuum, two pipe gravity, high pressure and the two pipe gravity open system.

In the vacuum system, condensate and air are removed from the heater through the return main by means of a mechanically operated vacuum pump. Air is discharged to the atmosphere; condensate to the boiler.

Due to the extremely close range of temperature between the steam and condensate, a bucket or float type trap is used for condensate removal. A thermostatic trap is used for air removal.

Two Pipe Gravity

In this system, a definite steam pressure is maintained in the return main. This pressure, together with the static head between the return main and the boiler water-line, returns condensate to the boiler without mechanical means.

The return connection on the return end of the unit is usually controlled by check and gate valves, with the air valve installed between the check valve and the unit for automatic removal of air. Air should never be discharged from heaters into the return mains of a closed gravity system.

High Pressure System

Operating steam pressure in this system is usually 20 pounds or more. Air is discharged through the hand operated pet cock, while the condensate is discharged through a high pressure float or bucket trap to the return main. Then the condensate is discharged into the hot well or through the boiler return trap to the boiler, but never directly from the unit to the boiler.

Two Pipe Gravity Open System. No pressure is maintained in the return main of the two pipe gravity open system. Condensate flows by gravity to the pump, receiver, or hot well, and is discharged to the boiler by mechanical means. On low pressure steam systems, the air is removed from heater units either by automatic air valves of the same type as on the gravity system, or through thermostatic traps as on the vacuum system, except that an open vent is installed on the return main; condensate is controlled by the float or bucket trap.

If desired, the same type of return specialties can be used as on the vacuum system. On high pressure steam systems, the air is removed either through the pet cock on the return trap or through the open vent on the return main. This may be done because return traps of the float or bucket types are designed to suit the pressure at which the system is to operate.

To be sure that unit heaters are selected to do a particular job satisfactorily, care should be taken that the unit heaters selected are rated in accordance with the standard test code adopted jointly by the Industrial Unit Heater Association and the American Society of Heating and Ventilating Engineers.

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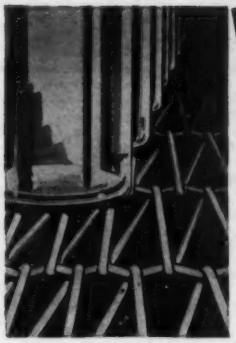

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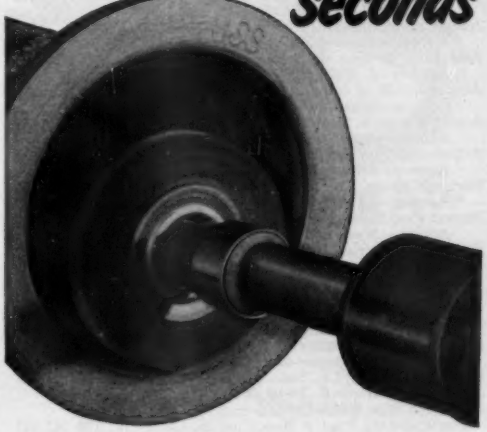

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'ROUND ABOUT
with the editors

(Continued from page 4)

The four recommended standards may be obtained from the following sources:

1. STRUCTURAL STEEL CONSTRUCTION—Specifications for Design, Fabrication and Erection of Structural Steel for Buildings (Riveted, Bolted and Arc-Welded Construction), revised June 1949. Institute of Steel Construction, 101 Park Ave., New York 17, N. Y.

2. REINFORCED CONCRETE CONSTRUCTION—A.C.I. Standard Building Code Requirements for Reinforced Concrete (A.C.I. 318-'51). American Concrete Institute, 18263 W. McNichols Rd., Detroit 19, Mich. (50 cents).

3. LUMBER AND TIMBER CONSTRUCTION—National Design Specification for Stress Grade Lumber and its Fastenings revised 1950. National Lumber Manufacturers Association, Washington, D. C. (25 cents).

4. PLUMBING — The National Plumbing Code, June 1951. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. (50 cents).

Michigan Handling Engineers Elect Officers

Kelsey

NEW OFFICERS for the ensuing year were elected by the Michigan Chapter of the Society of Industrial Packaging and Materials Handling Engineers at their May meeting in Detroit. Officers elected are: Don W. Kelsey, President; Charles E. Cummiskey, Secretary; Elmer Hamina, Treasurer; and Darrell A. Buhlman, Vice President; and Homer H. Mitchell, Vice President.

For Good Dope on Many Subjects

ONE OF THE functions of most governments is carrying on research, correlating reports and making them available to the general public. In this country this is done generally through government printing office. In the United Kingdom it is done through His Majesty's Stationery Office located in London, but with retail stores throughout the United Kingdom.

The export trade has not been overlooked and the British Information Services, 30 Rockefeller Plaza, New York 20, N. Y., is the outlay in this country. Lists of publications and a price conversion table can be obtained from this source.

From the plant engineering standpoint the most important are:

Sectional List No. 19 dealing with safety, health and welfare in factories; Sectional List No. 30 from the Ministry of Works dealing with construction, material and construction costs; Sectional List No. 3 on Department of Scientific and Industrial Research comparable to our Bureau of Standards; Sectional List No. 41 dealing with the National Physical Laboratory comparable to our Bureau of Standards; and Sectional List No. 14, from Ministry of Fuel and Power dealing with the Electricity Division.

Construction Material Shortages

ESTIMATES INDICATE that construction material shortages will be most acute during the fourth quarter of 1951 and the first quarter of 1952. During this period the demand for structural steel on a free-market basis will be about twice the apparent supply. Plants contemplating construction requiring appreciable quantities of steel, copper or aluminum should file their applications promptly with the NPA on CMP Form 4C, available from any Department of Commerce Field Office.

Film on Human Relations

A NEW SOUND slide film "An Introduction to Human Relations in Business and Industry," outlines the need for developing a better understanding of human relations by people in supervisory jobs.

Any reader who is interested may borrow this film for company use. Please address your inquiry to Human Relations for Industry, 443 Delaware Ave., Buffalo 2, N. Y.

Defense Production Pools

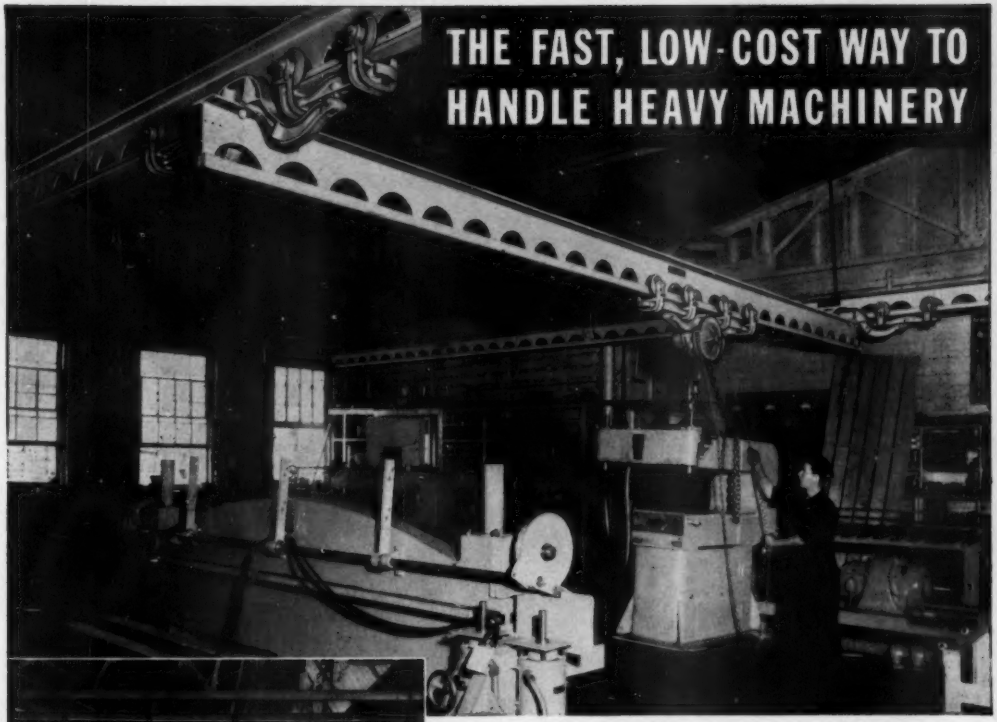
POOLING PRODUCTION FOR DEFENSE is the title of a new booklet issued by the DPA, explaining how small businesses may band together into pooled production units to handle defense contracts and subcontracts.

The booklet also lists 12 characteristics of an ideal pool, suggested from past experience. Some of these are: experienced, recognized leadership; plant facilities of members should complement each other; every pool needs engineering assistance; and some members should be familiar with Government procurement.

The booklet describes the advantages and disadvantages of pools of this kind, different types of pools, laws which may affect the formation and operation of the pools, and principal operating problems. The latter are listed as: inexperienced management; lack of initiative in seeking orders; insufficient funds; and, waning enthusiasm if orders are not forthcoming promptly.

Copies of the book can be obtained from the Office of Public Information, Defense Production Administration, Washington 25, D. C.

THE FAST, LOW-COST WAY TO HANDLE HEAVY MACHINERY



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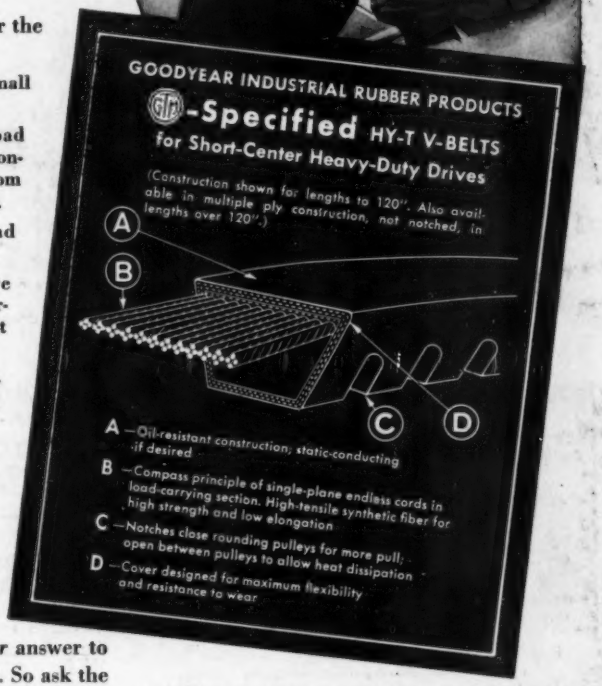
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